ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 2.] [1910.

VI.—THE GENUS MYXOPYRUM.

(*Oleaceae.*)

The genus *Myxopyrum* was founded by Blume to receive a plant collected in Java near Kuripan and at the foot of the mountain Salak in Java. This plant was described under the name *Myxopyrum nervosum*, Bl. in Bijdr. p. 683, and the description is transcribed by De Candolle in the Prodromus, viii., p. 290. In the Prodromus, viii., p. 301, a description of Wallich's genus *Chondrospermum* is given and placed under *Jasmineae*. This genus contains two species *C. smilacifolium* and *C. ? coriaceum* founded on Wallich's catalogue numbers 2837 and 2838 respectively, and the earlier history of the genus and of *C. smilacifolium* is given by De Candolle.

Blume, in 1850, in Mus. Bot. Lugd.-Bat. i. no. 20, p. 320, united *Myxopyrum* and *Chondrospermum* and gave short descriptions of the three species *M. nervosum*, *M. smilacifolium* and *M. coriaceum* and suggested that *M. coriaceum*, Bl., a Bornean plant, might possibly be the same as *Chondrospermum ? coriaceum*, Wall., no. 2838.

In the Flora of British India, C. B. Clarke adopts Blume's genus, stating there are three species, but he unites both *Chondrospermum smilacifolium* and *C. coriaceum* (Wallich's 2837, 2838) under *Myxopyrum smilacifolium*, Bl., and apparently leaves Blume's *M. coriaceum* as a distinct species.

In a bundle of specimens of *Strychnos*, recently received for name from Dr. Beccari, some examples of *Myxopyrum* from New Guinea and from the Kei Islands, were noticed, and owing to the difficulty of assigning them to an existing or to a new species, a general examination of the genus appeared to be desirable.

For this purpose the material from the herbaria of the Rijks-Museum, Leiden, and the Rijks-Universiteit, Utrecht, has been kindly sent to Kew by the Directors of those institutions. The Wallichian specimens in the herbarium of the Linnean Society of London have also been examined. Of the two sheets in the possession of the Linnean Society, one is Wallich, 2837—the type of *Chondrospermum smilacifolium* from Chittagong—and is the *Myxopyrum smilacifolium* of Blume. The leaves on one specimen are

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broadly ovate-acute, rounded or slightly cuneate at the base and the flowers, much decayed, appear to have the corolla lobes rather longer than the tube. In the other specimen on the same sheet the leaves are elliptic-lanceolate or elliptic-ovate, acute, ovate-cuneate at the base ; the flowers have lost their corollas. In both the stems are sharply 4-angled with angular ridges and the leaves are trinerved and have the margins entire.

The other sheet, Wallich, 2838, bearing the label *Chondrospermum ? coriaceum*, Wall., from Taong Dong Avae, and referred doubtfully by Blume to his *Myxopyrum coriaceum*, proves to be a species of *Strychnos*. As far as can be determined in the absence of flowers, the large broadly ovate, triplinerved leaves with five nerves and the smooth yellow stem suggest that this specimen should probably be referred to *Strychnos Nux-vomica*. Mr. Boodle, who has kindly examined the anatomy of this specimen in the Laboratory, informs me that the vascular structure agrees with that of the genus *Strychnos* and that the subsidiary cells of the stomata shew cuticular striations similar to those shewn in *S. Nux-vomica*.

The Leiden herbarium contains the type specimen of *Myxopyrum nervosum* from Salak, Java, together with other Javanese and Sumatran specimens ; a specimen of *Myxopyrum coriaceum*, Bl., from Borneo, collected by Korthals, which appears to be the type of Blume's species and is quoted as the type by Miquel, Flor. Ned. Ind. ii., p. 550, and a specimen from New Guinea labelled *M. smilacifolium*, Bl. The latter unfortunately has neither flowers nor fruits, but in the texture and shape of its leaves it is quite distinct from the Indo-Malayan specimens of *M. smilacifolium*. Mr. Boodle informs me that the anatomical structure of this specimen shews considerable agreement with *M. smilacifolium*, Bl., but differs in several details and that it is probably a different species of (or near) the same genus. Miquel in Flor. Ned. Ind., vol. ii., p. 1081 refers to this actual specimen as follows "*Myxopyrum smilacifolium*, specimen e Novâ Guineâ Herb. L. Bat. dubium videtur, quippe foliis ellipticis vel elliptico-oblongis saepe obtusis, subintegerrimis, haud valide tri- vel subtriplinervis."

Miquel, l.c. p. 550, at the end of the short diagnosis of *M. smilacifolium* states that probably it does not differ from the preceding species *M. nervosum*, despite the marked difference in the descriptions of the flowers. In the Utrecht herbarium there are only three specimens of this genus belonging to *M. nervosum*, and *M. coriaceum* ; two of these are evidently fragments from Leiden, but there is one specimen of *M. nervosum* from Java (?), which appears to be one of Blume's specimens, a fragment of which is also at Leiden.

From an examination of the available material it appears that ten species of the genus *Myxopyrum* may now be recognised. Of three of these, material is very scanty, but an anatomical examination establishes them as species of the genus.

The geographical distribution of the genus is of interest, extending from Southern India, Sikkim and Assam, through Burma to Malaya and the Andaman Islands, and thence to Sumatra, Java, Borneo, New Guinea, the Kei Islands and the Admiralty Islands in the Bismarck Archipelago.

The two Indian species, *M. smilacifolium* and *M. serratulum*, with elongated corolla lobes, are evidently nearly related and in their floral characters show greater affinity to Beccari's plants from New Guinea and the Kei Islands than they do to the species from the Malay Peninsula, Sumatra, Java and Borneo. It is unfortunate that the Admiralty Islands specimen, which has been named *M. cordatum*, is without flowers, but from its foliage it shows considerable resemblance to *M. ovatum*, from the Kei Islands.

M. macrolobum, *M. ovatum* and *M. cordatum* appear to form a closely allied group.

The three species, *M. nervosum* from the Malay Peninsula, Sumatra and Java, *M. ellipticum* from Borneo, and *M. Horsfieldii* from Java, form a very natural alliance, and it seems probable that the imperfectly known *M. coriaceum* also belongs to this group. In these species the lobes of the corolla are very short, and the much longer tube is thick and fleshy.

For purposes of systematic arrangement, the genus can be divided into two groups on the relation of the lobes of the corolla to the corolla tube. This division, which may not be an unnatural one, is here adopted and set out in the following key.

Clavis specierum.

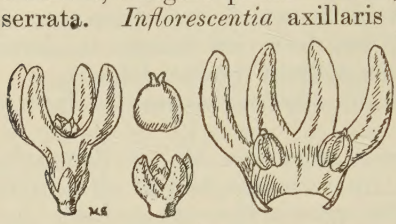
Corollae segmentes tubo longiores vel tubum aequantes.
Folia trinervia, marginibus serratis vel integris.
Foliorum marginibus integris vel superne plus minusve serratis ; corollae tubus 1 mm. longus, lobi 1·5 mm. longi
1. *M. smilacifolium.*
Foliorum marginibus versus apicem minute serratis ; corollae tubus 2 mm. longus, lobi 2·75 mm. longi
2. *M. serratulum.*
Folia triplinervia, marginibus integris.
Corollae tubus 1·5–1·75 mm. longus, lobi 3 mm. longi ; antherae e tubo corollae aliquatenus exsertae
3. *M. ovatum.*
Corollae tubus 2–2·5 mm. longus, lobi 3·5–4·5 mm. longi ; antherae in tubo corollae omnino inclusae
4. *M. macrolobum.*
Corollae segmentes tubo breviores.
Folia trinervia, basi rotundata margine integra
5. *M. ellipticum.*
Folia trinervia vel paullo triplinervia, basi rotundato-cuneata, margine integra vel superne serrata.
Corollae tubus 2 mm. longus, lobi 0·5 mm. longi
6. *M. nervosum.*
Corollae tubus 2·75–3 mm. longus, lobi 1·5 mm. longi
7. *M. Horsfieldii.*

Species non satis notae.

Folia late ovata, basi cordata, 5-nervia 8. *M. cordatum.*
Folia anguste elliptica, elongata, basi cuneata, trinervia
9. *M. coriaceum.*
Folia elliptica vel ovato-elliptica, basi cuneata vel rotundato-cuneata, triplinervia ... ... 10. *M. Zippelii.*

1. **Myxopyrum smilacifolium**, *Blume*, Mus. Bot. i. p. 320 (descr. emend.).

Folia ovato-elliptica vel anguste elongato-elliptica, 15–20 vel 18–25 cm. longa, 7–12 vel 6–8 cm. lata, subcoriacea, basi rotundata, trinervia, margine paullo inflexa, integra vel superne plus minusve serrata. *Inflorescentia* axillaris paniculata, compressa, multiflora; pedunculis pedicellisque glabris subglabrisve; bracteae ovato-lanceolatae, acutae, 3–4 mm. longae. *Flores* sessiles in cymulas congestae. *Calyx* 1 mm. longus, extra pilsosus, lobis 0·75 mm. longis ovatis subacutis. *Corollae* tubus 1 mm. longus, lobi 1·5 mm. longi, lineari vel lineari-spathulati, subcarnosi. *Stamina* filamentis brevibus prope tubum medium insertis; antherae 0·75 mm. longae, orbiculari-oblongae, e tubo corollae aliquatenus exsertae. *Ovarium* globosum, 0·5 mm. diametro; stigma minutum. *Fructus* baccatus, globosus, circiter 0·8 cm. diametro.



1.

India. Sikkim; Terai, *J. D. Hooker*; Upper Assam and Assam Plains, *Jenkins*; Assam, *Mrs. Mack*; Assam, Suddiya, *Herb. Griffith*, 3696; Chela, *Hooker and Thomson*, 2197; Cachar, Doarbund Pass and Shapore, *R. L. Keenan's Collector*; Chittagong, *Wallich*, 2837; Seetakond, *Hooker and Thomson*, 564.

Burma. Moulmain, *Lobb*.

Chondrospermum smilacifolium, Wall., Cat. No. 2837; Wight, Ill. t. 151, b. D; DC. Prodr. viii., p. 301. *Chionanthus smilacifolia*, Wall. in Roxb. Flor. Ind. i., p, 108; Roem. et Schult., Syst. Veg. Mant. i., p. 79; Spr. Syst. Veg. i., p. 35; Dietr. Spec. Plant. i., p. 242. *Ligustrum laurifolium*, Roxb., Hort. Beng., p. 3. *Myxopyrum smilacifolium*, Bl. Mus. Bot. Lugd.-Bat. i., p. 320; Kurz, For. Fl. ii., 160, and in Journ. As. Soc., 1877, pt. ii., 245; C. B. Clarke, in Hook. Fl. Brit. Ind., iii., p. 618.

Non *Chondrospermum coriaceum*, Bl., fide C. B. Clarke, l.c.

In the Journ. As. Soc. ii., p. 245, Kurz divides up the species into two varieties *α. genuinum* with the leaves more or less entire or minutely spinosely-toothed, and with elongated panicles and *β. ilicifolium* with spinose-serrate leaves and contracted panicles.

Myxopyrum smilacifolium, *Bl.*, var. ilicifolium, *Kurz*, in For. Flor. ii., p. 160, and in Journ. As. Soc. 1877, pt. ii., p. 245.

A typo differt in foliis angustioribus nervis et venis distinctis margine spinoso-serrato; inflorescentiis contractis circiter 5 cm. longis axillaribus rarius terminalibus pedunculis quadrangularibus.

Burma. Rather frequent in the tropical forests of Martaban and in those of the Andaman and Cocos Islands, *Kurz*, in Journ. As. Soc. l.c.; Pegu, *Kurz*, 2309 (Herb. Kew. ex herb Hort. Bot. Calc.).

This variety is apparently included with the species by Clarke in Flor. Brit. Ind. iii., p. 618.

A variable species as regards shape of leaves. In some specimens the leaves are narrowly elongate-elliptic; in others they are broadly ovate or ovate-elliptic; the panicle of fruits resembles a bunch of very small grapes. In the Flora of British India Penang

is cited as a locality for this species. This, however, appears to be an error, and probably refers to a specimen of *M. nervosum*, Bl. *cf.* King and Gamble, Materials for a Flora of the Malayan Peninsula, iv., p. 483.

The locality of the Andaman and Cocos Islands, cited by Kurz for his variety *ilicifolium*, also appears somewhat doubtful.

2. **Myxopyrum serratulum**, *A. W. Hill.*

M. smilacifolio, Bl., affinis, sed corollae tubo et lobis longioribus praecipue differt.

Frutex scandens. *Folia* obovato-elliptica vel elliptica, acuta vel sub-acuminata, 10–15 cm. longa, 3·5–6 cm. lata, basi rotundato-cuneata, margine versus apicem minute serrata, basin versus integra paullo reflexa, trinervia; petioli 0·7 mm.–1 cm. longi. *Inflorescentia* axillaris, plus minusve 3 cm. longa, paniculata, multiflora, gracilis; pedunculis pedicellisque minute pilosis, bracteis ovato-lanceolatis acutis 2–3 mm. longis. *Flores* breviter stipitati, in cymas 3-floras dispositi. *Calyx* 1–1·5 mm. longus, profunde 4-lobus, extra minute pilosus, lobis triangulari-ovatis subacutis, *Corolla* flava, tubus plus minusve 2 mm. longus, lobi lineares, obtusi, subcarnosi, erecti, 2·75 mm. longi, minute pilosi. *Stamina* 2, rarius staminodiis 2 etiam additis, filamentis brevibus in medio tubo insertis; antherae late ellipticae, apice glanduliferae, 1 mm. longae. *Ovarium* globosum; stylus parvus, bilobus. *Fructus* baccatus, obovoideus, circiter 1 cm. diametro.

2.

South India. Travancore, Merchiston, 760 m., *T. F. Bourdillon*, 555 (Herb. Kew); Anamalai Hills, *Beddome*, 5867 (Herb. Kew. et Mus. Brit.).

3. **Myxopyrum ovatum**, *A. W. Hill.*

Species distincta in magnitudine foliis et in floribus lobis longis.

Folia ovata, acuta vel paullo cuspidata, 15–20 cm. longa, 7·5–10·5 cm. lata, basi rotundata, margine integra, supra plus minusve vernicosa, coriacea, glabra, triplinervia, 5-nervia; petioli 1·5 cm. longi. *Inflorescentia* paniculata, axillaris, densa, multiflora; pedunculi pedicellique pilosi bracteis subulatis acuminatis 1·5–2 mm. longis. *Flores* sessiles, plus minusve in cymas 3-floras dispositi. *Calyx* 1 mm. longus, extra pilosus, segmentibus triangulari-acutis 4 rarius 5, 0·5 mm. longis. *Corollae* tubus 1·5–1·75 mm. longus, lobi 4 rarius 5, plus minusve 3 mm. longi, lineares, sub-carnosi, repandi vel reflexi superne pilosi. *Stamina* 2, rarius 3, filamentis brevissimis in medio tubo insertis; antherae plus minusve ovatae, 1·25 mm. longae, apice minute glanduliferae, e tubo corollae aliquatenus exsertae. *Ovarium* ovoideum, 0·5 mm. altum; stylus bilobus, 0·25 mm. longus. *Fructus* ignotus.

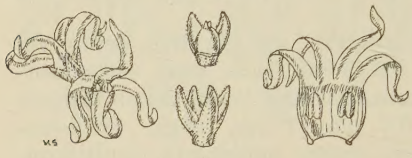
3.

Kei Islands. Kei Keteil a Tual, *Beccari* (VIII., 1873). (Erb. Coll. Beccari, 6658).

4. **Myxopyrum macrolobum**, *A. W. Hill.*

A *M. ovato*, A. W. Hill, floribus majoribus, antheris in tubo corollae omnino inclusis differt.

Folia ovata, acuta vel subacuta, 13–17 cm. longa, 6·5–9·5 cm. lata, basi rotundata, margine integra, supra paullo vernicosa, subcoriacea, glabra, triplinervia, obscure 5-nervia ; petioli 1 cm. longi. *Inflorescentia* paniculata, axillaris, laxa, multiflora, pedunculi pedicellique praecipue pilosi, bracteis paucis 1·5–2 mm. longis subulatis acutis. *Flores* sessiles, in cymas 3-floras dispositi. *Calyx* 1–1·5 mm. longus, extra pilosus, segmentibus 4 rarius 5, 0·5–0·75 mm. longis triangulari-acutis. *Corollae* tubus 2–2·5 mm. longus, lobi 4 rarius 5, 3·5–4·5 mm. longi, lineares, sub-carnosi, subacuti vel obtusi, erecti vel repandi, superne pilosi. *Stamina* 2 rarius 3, filamentis brevissimis in tubo paullo infra medium insertis ; antherae ovatae, 1–1·25 mm. longae, in tubo corollae omnino inclusae. *Ovarium* ovoideum, 0·5–0·75 mm. altum ; stylus bilobus, 0·2–0·25 mm. longus. *Fructus* ignotus.



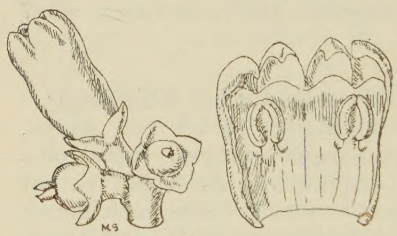
4.

New Guinea. Monte Arfak a Putat, *Beccari*, 942 ; (Erb. Coll. Beccari, 6657, 6657a.)

5. **Myxopyrum ellipticum**, *A. W. Hill.*

M. nervoso, Blume, affinis, sed foliis ellipticis coriaceis tubo corolla longiore et lobis brevioribus differt.

Folia elliptica, acuta, coriacea, 7·5–11·5 cm. longa, 3·5–5 cm. lata, margine integra, reflexa, trinervia, basi rotundata ; petioli circiter 5 mm. longi. *Inflorescentia* axillaris, paniculata, laxa, multiflora ; pedunculis pedicellisque glabris subglabrisve ; bracteae triangulari-ovatae, acutae, 1·5 mm. longae. *Flores* breviter stipitati, in cymulas 3-floras dispositi. *Calyx* profunde 4-lobus, lobi 0·5–0·75 mm. longi, orbiculari-ovati, acuti, glabri. *Corolla* pallide viridis ; tubus 4 mm. longus, obovoideus ad faucem ob annulum carnosum contractus ; lobi 0·5 mm. longi, ovati, acuti, incurvi. *Stamina* filamentis brevissimis in tubo 1·5 mm. supra basin insertis ; antherae ovato-cordatae, 1·25 mm. longae. *Ovarium* globosum, 0·5–0·75 mm. diametro ; stigmatis lobi ovati, acuti. *Fructus* ignotus.



5.

Borneo. Kuching, *Haviland*, 3039.

Allied to *M. nervosum*, but readily distinguished by the stout, elliptic leaves and by the long tube and short lobes of the corolla.

6. **Myxopyrum nervosum**, *Blume*, Bijdr. p. 683 ; DC., Prodr. viii., p. 290 ; Bl. Mus. Bot. Lugd.-Bat. i. no. 20, p. 320, t. 51 ; C. B. Clarke in Hook., Fl. Brit. Ind. iii., p. 618 ; King and Gamble, Mat. Fl. Mal. Pen., iv., p. 272, (descr. emend.).

Folia elliptica, 13–18 cm. longa, 6–9 cm. lata, vel ovato-elliptica, 10–17 cm. longa, 6–10 cm. lata, acuta vel subacuta, basi rotundata vel subcuneata, margine integro vel inferne integro superne dentato

vel serrato, trinervia vel paullo triplinervia, coriacea. *Inflorescentiae* axillares, paniculatae, multiflorae, laxae ; pedicelli pilosi ; bracteae subulatae, acutae. *Flores* sessiles, in cymulas 3-floras dispositi. *Calyx* 1 mm. longus, extra pilosus, segmentibus triangulari-acutis. *Corollae* tubus 2 mm. longus, subcarnosus ; lobi 0·5 mm. longi, triangulari-ovati, acuti, apice incurvi. *Stamina* filamentis brevissimis in medio tubo insertis ; antherae 1 mm. longae, 0·75 mm. latae, cordatae, in tubo corollae omnino inclusae. *Ovarium* ovoideum, stigmatis lobi ovati, acuti. *Fructus* baccatus, globosus, 1·8–2 cm. diametro, glaber.

Malaya. Batu Togeh, 100 m., *L. Wray, Jr.*, 4179 (Herb. Mus. Perak) ; without precise locality, *Maingay*, 427 ; Malacca, *Maingay*, 1475 ; Prince of Wales Island, no collector's name (Herb. Kew.).

Sumatra. Without precise locality or collector (Herb. Ludg.-Bat.).

Java. Salak, *Blume* ; Divena, *Herb. Dr. Blume*, 791 ; Bantar djatii, *Boerlage* (with fruits) (Herb. Ludg.-Bat.) ; without precise locality, *Zollinger*, 690 (Herb. Kew. et Mus. Brit.).

On the sheet of the Sumatran specimens at Leiden there appear to be two distinct species ; the smaller of these, bearing an inflorescence, is without doubt *M. nervosum*, the leaves being ovate-elliptical with a dentate margin in the upper portion.

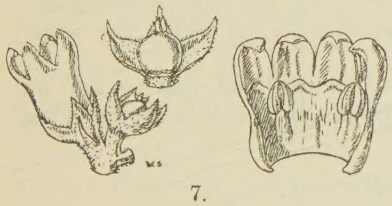
The other specimens have more or less obovate-elliptic leaves acuminate-cuspidate, with cuneate base and entire margins, trinerved, the nerves running into the base of the leaf in a very definitely cuneate manner. In texture the leaves of this plant are less coriaceous than those of *M. nervosum* and are similar in this respect to the doubtful species from New Guinea, referred to *M. smilacifolium*, Herb. Zipp. in the Leiden Herbarium, to which the name *M. Zippelii* has been given (p. 44).

King and Gamble *l.c.* cite localities for *M. nervosum*, Bl., in Penang, Perak, Malacca and Sumatra.

7. **Myxopyrum Horsfieldii**, *A. W. Hill.*

M. nervoso, Bl., affinis, foliis minoribus triplinervis floribus et antheris majoribus differt.

Folia obovata vel obovato-elliptica, acuta, 8–13 cm. longa, 3·5–6 cm. lata, plus minusve triplinervia, basi rotundato-cuneata, membranaceo-coriacea, margine integra vel superne obscure serrata. *Inflorescentia* axillaris, paniculata, laxa, multiflora ; pedunculi elongati et pedicelli minute pilosi ; bracteae subulatae vel lanceolatae, acutae, circiter 3 mm. longae. *Flores* sessiles, in cymulas 3-floras dispositi. *Calyx* profunde 4-lobus, extra pilosus, lobis triangulari-ovatis acutis 1 mm. longis. *Corollae* tubus 2·75–3 mm. longus ; lobi ovato-elliptici, subacuti, apice incurvi, 1·5 mm. longi, subcarnosi. *Stamina* filamentis brevissimis infra medium tubum inserta ; antherae 1·5 longae, cordatae, in tubo omnino inclusae. *Ovarium* globosum, circiter 1 mm. diametro ; stigmatis lobi ovati.



7.

Java. *Herb. T. Horsfield*, M.D. (Herb. Kew. et Mus. Brit.).

This species is closely allied to *M. nervosum*, Bl., but differs in its smaller, more delicate and triplinerved leaves and in the larger flowers with longer corolla lobes and larger anthers.

8. **Myxopyrum cordatum**, *A. W. Hill.*

Folia late ovata, acuta, membranaceo-coriacea, 13–15 cm. longa vel longiora, 7–10 cm. lata, basi cordata vel subcordata, e basi 5-nervia. *Inflorescentia* axillaris, paniculata, bene evoluta. *Flores* ignoti. *Fructus* baccatus, globosus, planus, 0·8 mm. – 1 cm. diametro.

M. smilacifolium, C. B. Clarke in Hook. Fl. Brit. Ind. iii., p. 618, partim; non Blume.

Admiralty Islands. Bismarck Archipelago, Challenger Expedition, *Moseley* (Herb. Kew.).

A species easily distinguished from *M. smilacifolium*, under which it was formerly placed, by its 5-nerved, ovate-cordate leaves, though the small smooth fruits resemble those of *M. smilacifolium*. It comes nearest perhaps to *M. ovatum*, A. W. Hill, but can be easily separated from that species by the character of the leaf venation.

9. **Myxopyrum coriaceum**, *Blume*, in Mus. Bot. Ludg.-Bat. no. 20, p. 320 (descr. emend.).

Folia anguste elliptica, elongata, acuta, 14–18 cm. longa, 4·5–7·5 cm. lata, trinervia, basi cuneata, coriacea, margine integro; petioli 1–1·5 cm. longi. *Inflorescentia* paniculata, pauciflora, pedicellis glabris vel subglabris. *Flores* breviter stipitati. *Calyx* 1·5–2 mm. longus, glaber, vel parce pilosus, segmentibus triangulari-ovatis acutis plus minusve 1 mm. longis. *Corolla* ignota. *Ovarium* ovoideum. *Fructus* baccatus, obovato-orbicularis, 1·3 cm. longus, 1·1 cm. latus, glaber.

Borneo. *Korthals* (Herb. Ludg.-Bat., Leiden).

10. **Myxopyrum smilacifolium**, Herb. Zipp. in Herb. Lugd.-Bat., No. 908, 161–792, non Blume.

Folia elliptica vel irregulariter ovato-elliptica, basi cuneata vel rotundato-cuneata, apice emarginata, paullo triplinervia, subcoriacea, 8–10·5 cm. longa, 4–5 cm. lata; petioli plus minusve 1·5 cm. longi. *Inflorescentia* ignota. *Fructus* ignotus.

New Guinea. *Zippel.*

This specimen was examined by Mr. Boodle who found that its anatomical structure shews considerable agreement with that of *M. smilacifolium*, Bl. (Cachar *Keenan's* Coll.), but differs in several details. It is probably a different species of (or near) the same genus.

The plant undoubtedly belongs to an undescribed species, and on account of its distinct character it is proposed to call it *Myxopyrum Zippelii*, A. W. Hill.

Species excludenda.

Chondrospermum (?) **coriaceum**, Wall. Cat., 2838, DC. Prodr. viii., p. 301; an eadem ac *Strychnos Nux-vomica*?

Myxopyrum smilacifolium, C. B. Clarke in Hook. Flor. Brit. Ind. iii., p. 618 partim; non Blume.

A. W. Hill.

VII.—GARDEN NOTES ON NEW TREES AND SHRUBS.

W. J. Bean.

II. Chinese Rubi.

One of the most noteworthy particulars about the new plants now being introduced from Central and Western China is the number and distinctness of the new species of *Rubus* amongst them. Mr. Wilson has introduced about 40 new species, and of these a large proportion represent the genus in aspects never before shown in gardens. Mr. A. Henry writing of his travels in Western China (*Garden*, Jan. 4, 1902, p. 3), observes that "each new valley and range yields some new species. When on the march I always reckoned on meeting a different species of *Rubus* each 10 miles of travel, and was never disappointed."

It would, of course, be premature to adjudge the value of many of these new brambles and raspberries in our gardens. As cultivators well know, the appearance and behaviour of plants in a wild state afford very unreliable evidence of their value under cultivation. In one respect—that of flower-beauty—these Chinese species appear to be inferior to the best American ones. Not one of the following, so far as can at present be judged, will stand comparison with such species as *R. deliciosus*, *R. odoratus* or *R. nutkanus*. But as regards beauty of foliage and stem, they certainly add new and distinct types to our gardens. Mr. Henry observes that many of these brambles in a wild state have exquisitely flavoured fruits, and whilst it is improbable that any of them will give fruit equal to our cultivated forms of raspberry and blackberry, it is not unlikely that they would, by hybridising, introduce new shapes and flavours.

To accommodate these new Chinese species at Kew a border has been made in the collection of *Rosaceae*, near the Pagoda, and the following species, as well as about 20 others, were planted there last autumn and will be available for inspection during the coming summer.

I have to thank Mr. Wilson for supplying information with regard to the habitats, the colours of the flowers, and the fruits of the following species, much of which has not been published before.

Rubus chroösepalus, *Focke*; Hooker's Icones Plantarum, t. 1952.

This species, which was first discovered by Mr. A. Henry in Hupeh, is a large straggling bush with terete, glabrous stems, armed with decurved spines. Its leaves are simple and bear a very strong resemblance to those of *Tilia argentea* (well known among limes for their silvery white under-surface), cordate, as much as 7 inches long by 4 inches wide, sharply dentate, cuspidate, glabrous above, the lower surface white with a very close tomentum; petioles glabrous, 1 to 2½ inches long, usually furnished with one or two decurved prickles. The flowers are borne in a terminal panicle, 6 to 9 inches long, each flower ½ inch across, without petals.

Mr. Wilson informs us that the fruits are black, small, ripe in September, but of poor flavour. He collected seed, for Harvard University, near Ichang, where this species grows up to 4000 feet. Some of the seed was given to Kew in January, 1908, and the young plants so obtained proved quite hardy last winter.

The large Tilia-like leaves of this *Rubus* with their white under-surfaces make it a distinct and striking species.

Rubus corchorifolius, *Linn. f.*

Although described by the younger Linnæus in 1781, this raspberry appears never to have been brought into cultivation until Mr. Wilson introduced it from Central and Western China, where he found it at altitudes of about 7500 feet, inhabiting open thickets.

It is a shrub of erect habit, vigorous plants in their second year making stems 6 feet high, which are terete, covered with fine down and armed with straight prickles up to ½ inch in length. The leaves are dull green, simple, ovate-cordate in main outline, but usually 3-lobed on the barren stems, acuminate, up to 7 inches in length, half to two-thirds as wide, coarsely toothed, finely pubescent beneath, and furnished with hooked prickles on the petiole and midrib. The flowers are white, solitary, and borne on short lateral twigs. Fruit bright red, large, and described by the collector as having "a delicious vinous flavour" and ripe in May and June.

The Kew plants were raised from seed received at the end of 1907 from Harvard University.

Rubus coreanus, *Miquel.*

The most attractive features of this species are its erect, stout stems covered with a beautiful blue-white bloom, and its lustrous, handsomely-cut, pinnate leaves. It is a valuable addition to brambles with blue-white stems.

The plants at Kew, which passed through the winter of 1908—9 quite unaffected by cold, were raised from seed, presented late in 1907 by Harvard University, which had been collected by Mr. Wilson in Central and Western China.

During the summer of 1909, their second season, these plants produced stems 8 feet high, erect, with arching branches, and armed with stout spines up to ½ inch in length, not hooked. The leaves are pinnate, composed usually of seven leaflets, the lateral ones of which are ovate or broadly elliptic and from 1½ to 3 inches long, cuneate at the base, sessile, coarsely serrate except towards the base; when young there are silky hairs on the parallel veins of both surfaces. The terminal leaflet is much larger and broader, often 3-lobed, and truncate or subcordate at the base. The common petiole is armed with hooked prickles.

This *Rubus* is evidently a vigorous, hardy species. Mr. Wilson found it at elevations of 6000 feet and says its fruits vary in colour from red to black, are ripe in July, but small and worthless.

R. **hupehensis**, *Oliver;* Hooker's Icones Plantarum, t. 1816.

(*R. Swinhoei*, Hance according to Focke in Bibl. Bot. 72, p. 43.)

This is a prostrate species with dark, terete stems covered thinly when young with a grey flocculence, and armed with very short decurved prickles. The leaves are simple, oblong-lanceolate, and from 3 to 4½ inches long by about 1½ inches wide, with acuminate tips, and a rounded base; the lower surface is covered with a pale grey tomentum, the margins are serrate, and the petiole about ¼ inch long. The flowers have not yet been seen in this country but they do not appear to be in any way attractive. The inflorescence is a short terminal raceme carrying in a wild state three to seven

flowers, the calyx being covered with grey tomentum like the under surface of the leaves, and the petals falling very quickly or being altogether absent.

Originally discovered by Mr. Henry in Hupeh, this *Rubus* was first collected by Wilson, in 1907, for Harvard University. Seeds presented by that institution to Kew early in 1908, produced plants which lived outside without protection through the following winter.

The species is worth growing for its distinct and ornamental foliage which resembles that of none other in cultivation.

Rubus irenaeus, *Focke.*

A low shrub with slender, creeping stems, which are covered with a thick greyish down, interspersed with very small, recurved prickles. The leaves are roundish, up to 6 inches or more in diameter, with a wide cordate base ; the margins are ciliate, sometimes obscurely lobed, always finely dentate ; the upper surface is glabrous and green, with a peculiar metallic lustre ; the lower surface covered with a pale brown tomentum, and more or less hairy on the yellowish prominent veins. Mr. Wilson describes the flowers as white and the fruits as large and red.

This interesting and distinct species, the contours of whose leaf suggest a small *Tussilago*, was discovered by Mr. Henry in Western China, where, according to Wilson, it is common in woods at elevations of from 4000 to 8000 feet. Seeds were presented to Kew early in 1908 by Harvard University and the young plants raised from them passed unharmed the winter of 1908—9. The species would appear to be nearly or quite evergreen, for at the time of writing (early February) our plants, although transplanted in autumn, still retain their leaves.

The species promises to make a handsome low covering for the ground and will probably thrive in semi-shaded spots.

Rubus omeiensis, *Rolfe* in K.B. 1909, p. 259.

A large straggling shrub with round, pubescent, unarmed, slender stems. The leaves are simple, five- or obscurely seven-lobed, irregularly or doubly toothed, dull green above, greyish beneath and slightly downy on both sides, 3 to 7 inches long and wide ; the petioles pubescent and 1½ to 3 inches long. The purplish flowers appear in many-flowered terminal panicles, and are followed by black fruits which Mr. Wilson informs us are of good size and flavour. The calyx and pedicels are densely pubescent.

This *Rubus* was found by Wilson on Mount Omei, and was introduced by him for Messrs. Veitch, who flowered it in August, 1908. Seeds obtained for Kew from Harvard University germinated in the spring of 1909.

It is a common plant in Western Szechuen up to 6000 feet, and ought to prove very hardy in the British Isles.

Rubus Parkerii, *Hance.*

A distinct species of scandent habit, with slender, terete, dark brown stems, armed with scattered, short, decurved spines, and covered by a dense greyish pubescence. The leaves are simple, broadly lanceolate, or obscurely 3-lobed, 4 to 7 inches long, 2 to 3 inches wide, with a cordate base and a long-pointed apex. The lower surface is covered with reddish-brown, velvety pubescence ;

the upper one, especially on the veins, with similarly-coloured short hairs. The margins are dentate and ciliate; the petiole about 1 inch long, bearing a few decurved prickles, and covered with hairs, some of which are tipped with black glands. The flowers are borne in an elongated lax panicle, the calyx being covered with red, glandular hairs. The fruit is black, and ripens in June.

Mr. E. H. Parker, after whom this species is named, first collected it in Szechuen in 1881. Seeds collected near Ichang in 1907 by Wilson, were presented to Kew by Harvard University, and plants raised from them have stood the last two winters quite uninjured.

This *Rubus* has distinct and striking foliage, and promises to make an elegant climber.

Rubus Playfairii, *Hemsley*.

A rambling shrub with very slender, whip-like, dark-green stems, covered when young with a cobweb-like down and bearing small decurved spines $\frac{1}{16}$th to $\frac{1}{12}$th inch long. The leaves are composed of three to five leaflets; the normal number appears to be five but the lower leaves on the stem have three or four leaflets only. The leaflets are lanceolate to linear-lanceolate, serrate, the terminal one the largest, up to 6 inches in length and shortly stalked; lateral leaflets sessile or very shortly stalked. In some of the ternate leaves, the terminal leaflet is large and broad and the lateral ones unequally bilobed. They are all bright-green above, with a very close, pale grey felt beneath. The curious stipules are $\frac{1}{2}$ inch long, very deeply laciniated. The flowers have little or no beauty, being $\frac{1}{2}$ inch in diameter, the calyx tomentose, with short acuminate lobes. The fruit is black, ripening in August and is said by one collector to be excellent.

Whilst this *Rubus* may have little to recommend it in its flowers or fruit, it is very graceful in habit and very distinct and handsome in foliage.

Rubus polytrichus, *Franchet*.

A dwarf shrub with prostrate stems, inhabiting woodland and remarkably distinct from any other *Rubus* in cultivation. The stems are terete, quite devoid of prickles or spines, but densely covered with pale yellowish-brown hairs, $\frac{1}{8}$th inch long. The leaves are simple, cordate, about 3 inches long by 2 inches wide, sharply toothed, the petiole, which is about $1\frac{1}{2}$ inches long, having the same hispid character as the stems; the under surface is covered with a close whitish felt and the midrib and chief veins are furnished with bristly hairs, whilst on the dark-green upper surface the hairs are confined in rows between the chief veins. The flowering stems are erect, the flowers white, 1 inch or rather more across, the fruit bright-red and of good size and flavour.

The plants at Kew were raised from seed collected for Harvard University and presented to Kew early in 1909.

As the species, according to Mr. Wilson, is found at elevations of about 10,000 feet in Western China, it will no doubt prove very hardy with us, and from its native habitats we may assume it will make an addition to that class of shrubs which thrive in shaded or semi-shaded positions—a class which cultivators will be glad to see augmented.

Rubus Veitchii, *Rolfe* in K.B. 1909, p. 258.

Of all the newer *Rubi* introduced from China, this will, I think, prove to be the most attractive. It is a bush of neat habit, with erect, terete, glabrous stems and slender branchlets, all covered with a purplish bloom and thickly furnished with straight slender prickles. The very handsome leaves are pinnate, up to 9 inches in length, with from three to six pairs of leaflets and a long pinnatifid terminal one. The lowest leaflets are from 1 to 2 inches long, ovate, coarsely and angularly toothed, each succeeding pair becoming smaller towards the apex ; they are lustrous-green above, and grey tomentose beneath. The common stalk is armed with prickles like the stems. The flowers are produced a few together in terminal flattish panicles, the calyx densely pubescent, the petals purple. Fruit of medium size, black covered with a purplish bloom.

This striking plant was discovered by Wilson in the Min Valley, Western China, where it grows in dry localities up to 7000 feet. It flowered with Messrs. Veitch in 1908. The Kew plants were raised from seeds sent by Harvard University in 1908.

Its purple stems and especially its handsomely divided leaves ought to make the species popular in gardens.

VIII.—TREES OF THE NORTH-EASTERN TRANSVAAL.

C. E. Legat.
(Conservator of Forests.)

Notes on the Tree Vegetation seen between Pietersburg and Messina, and between Louis Trichardt and Shewass in North-Eastern Transvaal, September 13th–30th, 1908.

The following notes and photographs by Mr. C. E. Legat have been sent to Kew by Mr. J. Burtt Davy, Botanist to the Transvaal Government. The route traversed by Mr. Legat was through a district situated in the extreme north-east of the colony, a region in which very little botanical collecting has been done.

The specimens gathered on the journey were, unfortunately, in many cases not sufficiently complete for a critical determination of the species, but better material could scarcely have been obtained owing to the unfavourable time of the year at which the visit was made.

The Transvaal Department of Agriculture published in 1907 a list of the native trees of the colony compiled by Mr. Burtt Davy, and the same author subsequently added a list of addenda in the *Kew Bull.*, 1908, pp. 145–175. The species recorded by Mr. Legat which are not included in those two lists are indicated by an asterisk. Where a name in the notes is followed by a number in brackets, the species in question has been collected by Mr. Legat and identified at Kew ; the numbers are those of the Herbarium of the Transvaal Department of Agriculture. In all other cases, except where otherwise noted, Mr. Legat is responsible for the accuracy of the names.

The collection contains at least one species of especial interest (no. 4899, p. 51), for the same plant was gathered by Dr. (now Sir John) Kirk at Tete on the Zambesi as long ago as 1860, and, so far as we are aware, has not been found since. It undoubtedly belongs to the *Leguminosae* and the leaves are very similar to those of *Schotia transvaalensis*, Rolfe. The fruits and seeds, however, are quite different.

Unfortunately, Kirk's and Legat's specimens alike consist of leaves and fruits only with no flowers, so that it has not been possible to fix the position of the plant in the order with any degree of certainty.

On the road from Pietersburg (4350 feet) to Klipdam (3950 feet) the following species were observed : *Dombeya rotundifolia*, *Sclerocarya caffra*, *Dichrostachys nutans*, *Acacia horrida*, and a species of *Munâulea*. This part of the country is of a level, sandy nature and is only lightly wooded.

In the vicinity of Klipdam, *Zizyphus mucronata* and *Acacia hebeclada* (in flower) were seen. Frost, sufficient to injure small Jacaranda trees, occurred here in July, 1908.

Between Klipdam and Dwars River (3550 feet) the country is more thickly wooded and very flat, but the climate is dry and the soil often shallow, so that the scrub never reaches much more than 20 to 25 feet in height. The following trees were noted : *Dovyalis* sp., *Sclerocarya caffra*, *Dichrostachys nutans*, *Peltophorum africanum*, *Acacia arabica*, *A. hebeclada* (in flower), *A. horrida*, and a species of *Combretum*.

At Dwars River three Acacia trees were found, namely : *A. glandulifera*, *A. Rehmanniana*, and *A. spirocarpoides*, the last flat-topped and with twisted pods.

From Dwars river to Bandolier Kop (3850 feet) the character of the vegetation is much the same as the last. It may here be mentioned that the Meteorological Department gives the height of Bandolier Kop as 3775 feet, showing that the aneroid used by me was, at least, approximately correct. The following trees were seen : *Dombeya rotundifolia* (in flower), *Zizyphus mucronata*, *Sclerocarya caffra*, *Peltophorum africanum*, *Acacia arabica*, *A. spirocarpoides*, and an arborescent species of *Euphorbia*.

Between Bandolier Kop and Louis Trichardt (3200 feet) the country is flat but the soil is less sandy and the trees are taller ; the following species were collected : *Elaeodendron* sp. (no. 4918), *Rhus* (*Heeria*) spp. (nos. 4915 and 4917), *Ormocarpum* sp. (no. 4916), *Schotia brachypetala ?** (no. 4920), *Acacia robusta* (no. 4919), *Albizzia* sp. (no. 4921), *Combretum* spp. (nos 4914 and 4922), and *Carissa arduina* (no. 4913) ; in addition the following were seen but not collected ; *Dombeya rotundifolia*, *Sclerocarya caffra*, *Lonchocarpus Capassa*, *Acacia arabica*, *A. glandulifera* (in flower), *A. Rehmanniana*, and a species of *Ficus* which was first encountered at an elevation of 3200 feet.

Between Louis Trichardt and the lower edge (4800 feet) of the dense forest at Hangklip, *Acacia Davyii* and *A. natalitia* were collected (compared in Forestry Department Herbarium).

The forest at Hangklip, the upper limit of which is 5000 feet, faces south and south-east, the mountain itself being probably 200 feet higher, and contains the following trees: *Kiggelaria africana* (no. 4931), *Calodendron capense*, *Clausena inaequalis*, *Xanthoxylon capense*, *Trichilia* sp. (probably *T. capitata*), *Gymnosporia deflexa* (no. 4923), *Bersama* sp. nov. (no. 4927), *Rhus laevigata*, *Pygeum africanum* (Bitter-Almond), *Weihea* sp., *Combretum Kraussii*, *Tricalysia capensis* (no. 4929), *Maesa rufescens*,* *Rapanea melanophloeos*, *Royena Wilmsii* (no. 4928), *Halleria lucida*, *Xymalos monosperma*, and *Celtis* sp. (very common). Specimens of many of these species were not collected, being well known to Mr. Lane-Poole, the District Forest Officer at Woodbush, and myself.

From Louis Trichardt I trekked northward over the Zoutpansberg range which runs east and west. This is the range of which Hangklip (5200 feet) is a member. The road crosses the hills at an elevation of about 4000 feet. On the reverse slope from Louis Trichardt *Pterocarpus angolensis* and *Phoenix reclinata* first occur at about 3800 feet, the former disappearing at an elevation of 3500 feet and the latter, which grows in damp places and along the banks of streams, at 2700 feet.

Between the Zoutpansberg range and the next range northward and parallel to the first is a valley in which *Tecomaria capensis* (no. 4895) was gathered. The road which traverses the valley passes through the farm Mooiplaats (2900 feet) and crosses the mountain at Wylie's Gorge (2700 feet). Between the former place and Sulphur Springs (2600 feet) *Zizyphus mucronata*, *Lonchocarpus Capassa*, *Acacia pallens* (Knoppiesdoorn), *Combretum porphyrolepis* (Leadwood), and *Bolusanthus speciosus* were noted.

Immediately after passing through Wylie's Gorge and traversing the second range of hills from Louis Trichardt, the Baobab was seen for the first time. The specimens were dwarf and they occur on arid, hot and rocky slopes on the north side of the range down to about 3000 feet. These trees become larger and are found more frequently as Sulphur Springs is approached. They were quite leafless and not in flower and the fruits of the previous season were still hanging at the time of my visit.

From Wylie's Gorge to the Limpopo it was very noticeable that the trees were in a much less forward condition than those, even of the same species, on the south side of the Zoutpansberg range. The greater aridity of the country north of the mountain ranges may probably account for this, the spring apparently being influenced more by moisture than by warmth.

Between Wylie's Gorge and Sulphur Springs, *Cassia abbreviata* (no. 4912a) and *Elaeodendron* sp. (no. 4911) and another Celastraceous plant (no. 4912) were collected, and at Sulphur Springs *Maerua angolensis* (no. 4901), *Balanites* sp. (no. 4897), *Acacia clavigera** (no. 4900), another Leguminous plant (no. 4899, not determined), and a species of *Euphorbia*. The last-mentioned grows in almost pure sand in low, dense thickets. The Leguminous plant (no. 4899) is one of the few evergreen species occurring in this region. It becomes a fine umbrageous tree and appears to be confined to alluvial flats. Buck are said to eat the fruits. I did not see any others except those at Sulphur Springs hotel.

Copaifera Mopane is first met with five miles north of Sulphur Springs hotel and about a mile from the springs. It occurs there as pure scrub of an open character, attaining a height of from 5 to 15 feet, and growing in red sand from which grasses and other vegetation are conspicuously absent. A few miles further north, on better soil in company with grass, it is found from 20 to 40 feet high. Still further north I came across an area of this species only 2 to 5 feet high with grass growing amongst it. The soil in this locality, however, is poor and shallow. Between Blauwkop (2200 feet) and Messina (2000 feet) it grows mixed with other scrub and rarely reaches larger dimensions than 25 feet.

*Maerua rigida** ? (no. 4903) was collected at Blauwkop, and a species of *Sterculia* (no. 4904) between there and Sand River. At the latter place a species of *Boscia* (near *B. Pechuelii*) and *Acacia albida* were gathered. The Acacia grows to a large size and is found along the course of the river. [According to Rochebrune in "Toxicologie Africaine" this tree is the source of Gum Salabreda, a vermicelli-like gum which exudes in tears of the thickness of a goose-quill, more or less undulated, of a faintly yellowish colour with a finely fissured surface in small cubes, and breaking with a glassy fracture. In *Trans. Linn. Soc.*, Vol. xxix., p. 67, Grant states that the tree is known in Nubia under the name of "Laraz," and that the leaves are eaten by goats and the bark used in curing leather.] A fan-leaved palm, probably a species of *Hyphaene* which I did not collect, large sized leadwoods (*Combretum porphyrolepis*) and *Lonchocarpus Capassa* were fairly common at Blaauwkop.

Between this place and Messina, *Acacia Senegal** (no. 4910) was gathered. It grows very straight and is conspicuous on account of its height, often being half as tall again as the rest of the scrub. It was just breaking into leaf at the time of my visit.

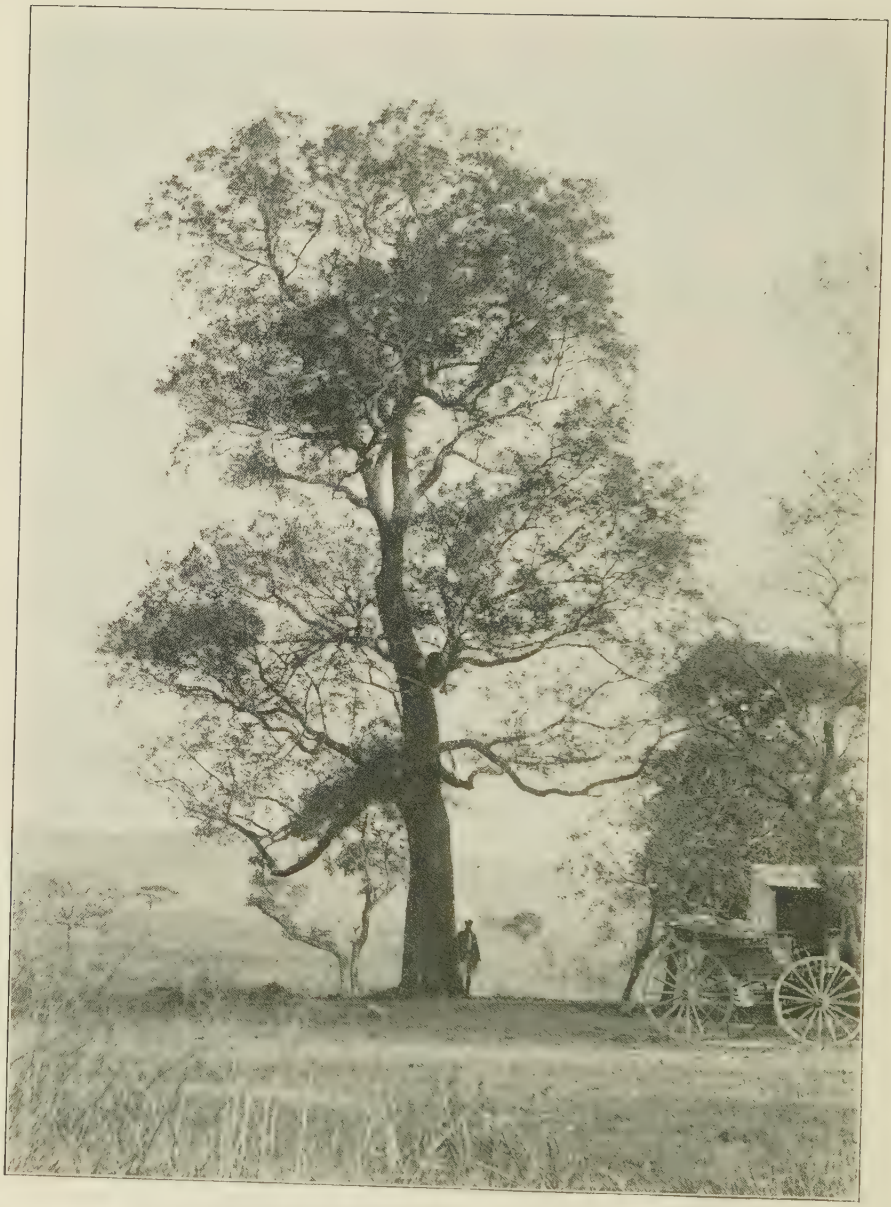
At Messina, *Cassia abbreviata* (no. 4909) and *Acacia kwebensis** no. 4907) were collected. The following trees were also seen: *Adansonia digitata**, *Zizyphus mucronata*, *Sclerocarya caffra*, *Cassia* sp., *Copaifera Mopane*, *Lonchocarpus Capassa*, *Acacia pallens* and *Combretum* sp. The *Adansonia* occurs from north of Wylie's Gorge to the Limpopo, attaining larger dimensions and becoming more abundant as one proceeds northward.

Along the Limpopo, 12 miles north-west of Messina at an elevation of 1600 feet, the following trees were observed: *Adansonia digitata**, *Lonchocarpus Capassa*, *Copaifera Mopane*, *Acacia pallens* and the fever tree (*Acacia xanthophloea*) which was in flower. The abundance of scent emanating from the flowers of the last mentioned is remarkable, even for an *Acacia*. The banks of the river in this region are not nearly so densely wooded as might be expected, and the whole country from Sulphur Springs to the Limpopo is a low scrub-forest with open canopy. In places it is thick and almost impassable. This region is the most arid in the Transvaal, and in many places there is little sign of grass.

From Messina I returned to Louis Trichardt and set out again from there on September 24th for the farm Geluk (4200 feet) which lies about 20 miles to the north-east. The road passes along a valley formed between two parallel ranges of hills (part of the Zoutpansberg) running east and west. This valley is about a

TRICHILIA EMETICA.

[*To face page* 52.



EKEBERGIA MEYERI.

To face page 53.]

mile wide and is well watered and fertile. The tree flora is interesting on account of the occurrence of the following species, which are common to the Drakensberg forest, but which grow here in clumps on the veld. It is probable that these clumps are the remnants of what was formerly continuous, dense forest, which, however, has been burnt out in comparatively recent times:—*Clausena inaequalis*, *Xanthoxylon capense*, *Rhus laevigata*, *Pygeum africanum*, *Brachylaena discolor*, *Rapanea melanophloeos*, and the Monkey Rope. On the sides of the hills bounding the valley were *Pterocarpus angolensis*, *Erythrina caffra*, species of *Combretum*, *Terminalia*, Thorns and Figs. The species collected were as follows: *Pittosporum viridiflorum* (no. 4888), *Garcinia* sp., probably *G. angolensis* (nos. 4883 and 4894), *Ochna pulchra?* (no. 4887), *Mundulea suberosa** (no. 4880), *Eugenia* sp. (no. 4889), *Canthium* sp. (no. 4885), *Paretta* sp. (no. 4884), *Tricalysia* sp., near *T. jasminiflora* (no. 4881), and *Vangueria infausta* (no. 4883a).

Leaving Geluk I went on to Shewass via Fairview (2700 feet). At Fairview I found *Trichilia emetica* (Plate 1), *Ekebergia Meyeri* (no. 4879—Plate 2), and *Brachylaena discolor* (Vaalbosch).

[*Trichilia emetica*, Vahl., "Red Esschenhout" is widely distributed in Tropical Africa, and is valued for its seeds, which yield a high percentage of a fatty oil used in native cookery, and suitable for the manufacture of soap and candles. Considerable quantities of the seeds are imported into Marseilles from Inhambane for the extraction of oil for soap making. A full account of the uses of this tree is given in "Useful Plants of Nigeria," *Kew Bull.*, *Additional Series* ix., p. 147.

Ekebergia Meyeri, Presl., "Essenwood" is used in Cape Colony for many purposes, such as carriage and wagon work, implements, &c., and is also said to be suitable for railway sleepers. According to Mr. W. Bazley, it is best known by its native name, Umnyamati. It grows to a large tree, with a trunk sometimes 5 feet in diameter. It is not a hard wood, nor can it properly be classed as a soft wood; although not very strong, it makes good useful boards for inside work, such as doors, boxes, &c. It does not stand well if exposed to wet or damp; in fact, in such situations, it decays in a short time; it has something of the grain of ash. It is a fine spreading tree, and looks well when in full foliage, but gaunt when bare in the summer months.

The bark has been used for tanning leather, and the roots by the natives as a remedy for dysentery. Fourcade states that the bark is poisonous, and is used by the natives in small doses as an emetic. (Wood & Evans, Natal Plants, i., 1899, p. 8, with pl. 6.)].

Brachylaena discolor and *Pygeum africanum* (Bitter Almond), seem to be the same as the Drakensberg trees which occur in the open veld.

Parinarium Mobola (nos. 4878 and 4930) becomes increasingly plentiful as Hood's Store (2200 feet) and Palmary's Store (2200 feet) are approached. It grows to a tree 30 to 40 feet high, with a stem 18 inches in diameter. In places it forms bush with complete canopy, the crowns interlacing. Natives, when driven by necessity, make beer from the fruits. This part of the country is well watered, and the character of the vegetation indicates a high

rainfall, probably not less, on an average, than an annual fall of 50 inches. *Rauwolfia natalensis* is common in this stretch of country, and at Palmaryville (2200 feet) I came across a specimen of *Oncoba spinosa* (identified by the Govt. Botanist).

On the road to Shewass from Palmaryville, *Pygeum africanum* and *Brachylaena discolor* were growing on the open veld at 2300 feet. The occurrence of these species in this district serves to indicate the moist nature of the climate.

At Shewass (3400–3500 feet) there is a dense forest which runs east and west and has an eastern exposure. The elevation of the bush is from 3200–3600 feet and the trees are from 50–75 feet high. This forest differs entirely from the yellow-wood forests of the Drakensberg; the number of species occurring in it is comparatively small, and several of them are, I think, unrecorded for the Transvaal. The principal trees are *Albizzia fastigiata** (no. 4867) and *Chrysophyllum Magalis-montana* (no. 4824), whilst others noted included the following: *Trichilia emetica*, *Rhus laevigata*, *Combretum Kraussii* (Vaterlands Wilge), *C. holosericeum** (no. 4868), *Anthocleista zambesiaca* (common) and a species of *Ficus* (no. 4875). The *Chrysophyllum* attains a height of 30–40 feet, whilst *Combretum holosericeum* reaches 50 feet with a trunk 18 inches in diameter, and has a bark which resembles that of *Curtisia*. *Albizzia fastigiata**, presumably the "Flat Crown" of Natal, grows to a height of 50 feet, with a bole of 20 feet and a diameter of 2 feet. The natural regeneration of this species is very good. Other trees noted in the bush were *Acacia ataxacantha*, *Brachylaena discolor*, *Maesa rufescens*, *Nuxia floribunda*, and the cabbage-wood, whilst the following were collected: *Neumannia theaeformis** (no. 4872), *Rawsonia lucida* (no. 4869), *Pterocelastrus* sp. (no. 4822), *Albizzia fastigiata** (no. 4867), *Combretum holosericeum** (no. 4868), *Eugenia* spp. (nos. 4826 and 4876) *Grumilea* sp. (no. 4870), *Chrysophyllum Magalis-montana* (no. 4824), *Landolphia* sp. (no. 4874), *Bridelia micrantha* (no. 4823), and a species of *Ficus* (no. 4875).

Parinarium Mobola and *Pterocarpus angolensis* (in flower) were seen round the edges of the bush on the slopes of the hills. Throughout the forest the *Landolphia* vine (no. 4874) is common, climbing right into the crowns of the trees. Though rather early in the season, I collected a small quantity of rubber which appears to be of excellent quality. I found this vine at the Pipiti Falls and it also occurs at Tengive, Makundi Nek, Luimbi, Ishautu, Wuba and many other places in the N.E. Transvaal. It grows mainly in forest composed of *Chrysophyllum* and *Albizzia*. The Bavenda name of the rubber is "Mavungo."

On the mountain ridge forming the northern boundary of the Shewass bush and facing due south is a normal forest, similar to the Houtbosch or the Drakensberg. There is, however, no undergrowth of shrubs in the forest, only grass being found beneath the trees, yet the canopy is continuous though not so dense as that of the Drakensberg forest. The lower and upper ridges are approximately 3600 feet and 3800 feet respectively. Ferns and mosses were entirely absent. The following species were noted: *Xanthoxylon capense* (Paardepraam), very abundant, *Acacia ataxa-*

cantha, *Combretum Kraussii*, *Eugenia* sp., *Cussonia* sp., *Gardenia Rothmannia*, *Brachylaena discolor*, *Maesa rufescens*,* *Rapanea melanophloeos*, *Nuxia floribunda*, *Halleria lucida*, and *Xymalos monosperma*. The last mentioned species was scarce and usually very dwarf. *Neumannia theaeformis** and *Ekebergia Meyeri* were common at Shewass.

At Pipiti Falls, halfway between Shewass and Palmaryville, I came across *Adina Galpini* and *Tricalysia capensis* (no. 4873).

From Shewass I visited Tschoma mission station (2400 feet) and collected a species of *Acacia* (no. 4821). This tree was not more than 20 feet high but the spread of its branches was 90 feet.

Bauhinia reticulata (no. 4820) was collected close to Fonseka. Only one Baobab, and that a small specimen, was seen on the Shewass trip. It was found between Fairview and Palmaryville.

On the mountain above Tschoma mission station is found Drakensberg forest, but, owing to unfavourable weather and the short time at my disposal, only a cursory examination could be made of it. Black stinkwood (*Ocotea bullata*), however, was fairly common.

Explanation of Plates.

1. *Trichilia emetica*, Vahl., "Red Esschenhout" at Fairview, Spelonken, Zoutpansberg.

2. *Ekebergia Meyeri*, Presl., Essenwood (Essenhout or Esschenhout), Fairview, Spelonken, Zoutpansberg.

IX.—DIAGNOSES AFRICANAE: XXXIV.

1071. **Chironia** (**Plocandra**) **humilis**, *Gilg*, var. **zuluensis**, *Prain* [Gentianaceae-Chironieae]; varietas distincta habitu inflorescentiaque *C. humili*, Gilg, var. *Wilmsii* simillima, sed caulibus saepe a basi ramosis, foliis radicalibus evanidis, caulinis inferioribus obovatis obtusis 2·5–4 cm. longis 1–1·5 cm. latis, superioribus lanceolatis acutis 2 cm. longis 4 mm. latis nec plane linearibus recedit et de *C. purpurascente* typica meminit. *C. purpurascens*, Prain in Dyer, Fl. Cap. iv. 1. 1108 partim et quoad spp. in ditione Zulu a d^a McKenzie lecta tantum.

South Africa. Zululand: Ginginhlovu, 30–35 m. alt., *Wylie in Herb. Wood*, 11,355; without precise locality, *Mrs. McKenzie*.

This rather distinct form combines the short primary peduncles of *C. humilis* with foliage unlike that of either of the varieties of that species and much more like the foliage of typical *C. purpurascens*. On this account the only, and somewhat imperfect, specimens of this plant, collected somewhere in Zululand by Mrs. McKenzie, in the herbarium at Kew when the account of the genus *Chironia* was drawn up for the *Flora Capensis*, were referred to *C. purpurascens*. The communication by Mr. Medley Wood in October, 1909, of some excellent specimens of this plant obtained by Mr. J. Wylie in the same region, has shown that it is necessary to accord it separate treatment. Those who adopt the view that *C. humilis* and *C. Wilmsii* are conspecific must treat this Zululand

plant as a form of the same widened species; those who are constrained to consider *C. humilis* and *C. Wilmsii* distinct, will probably consider the plant now characterised a separate species.

1072. **Microtea gracilis**, *A. W. Hill* [Phytolaccaceae-Rivineae]; *M. Burchellii*, N.E. Br., similis sed foliis longioribus, inflorescentiis tenuibus gracilioribus, stigmatibus brevioribus et fructibus inconspicue costatis differt.

Annua 9–23 cm. alta, caules singuli superne ramosi. *Folia* elliptico-linearia, acuta, mucronulata, subherbacea, 2–4 cm. longa, fasiculata, densa. *Inflorescentia* gracilis, spicata, 6–15 cm. longa, inferne sterilis, superne floribus laxe dispositis; bracteis perianthio subaequalibus triangulari-ovatis acutis subintegris vel paullo 3-dentatis. *Perianthii* segmenta 5, 1 mm. longa, inaequalia, late vel anguste elliptica, obtusa. *Stamina* 4, filamentis perianthio longioribus. *Ovarium* ovoideum, stigmatibus 2-4 erectis brevibus plus minusve concretis. *Fructus* globusus, 1 mm. diametro, costatus, costis 4 primariis et intermediis interruptis inconspicuis.

South Africa. Eastern region and Mozambique: Komati Poort, 300 m., *Schlechter*, 11,806.

1073. **Amanoa Schweinfurthii**, *Baker et Hutchinson* [Euphorbiaceae-Phyllantheae]; affinis *A. bracteosae*, Planch., a qua foliis apice rotundatis et leviter emarginatis facile distinguitur.

Frutex glaber, circiter 3 m. altus. *Rami* robusti, longitudinaliter sulcati, ramulis floriferis glaucescentibus. *Folia* oblanceolata vel oblongo-elliptica, basi acuta, apice rotundata et leviter emarginata, 7·5–10 cm. longa, 2–4·5 cm. lata, subcoriacea, supra subnitida, subtus glauca, nervis lateralibus utrinque 12-14 arcuatis subtus leviter elevatis, venis laxis vix elevatis; petioli laeves vel paulo rugosi, supra late canaliculati; stipulae oblique et late ovatae, 3·5 mm. longae, basi 4 mm. latae, coriaceae, dorso bicarinatae. *Flores* fasciculati, axillares, in ramulis lateralibus brevibus foliatis dispositi; bracteae ovatae, submembranaceae, glabrae. *Flores* ♂ juniores tantum visi. *Sepala* 5, ovata vel triangulari-ovata, coriacea, glabra. *Petala* oblonga, obtusa, subcoriacea, glabra. *Ovarii rudimentum* breve, trifidum, glabrum. *Flores* ♀ ignoti.

Tropical Africa. Nile-land: Jur; Mayob, *Schweinfurth*, 1544.

1074. **Megabaria**, *Pierre MSS. ex Hutchinson; De Wild. Étud. Fl. Bas.- et Moy.-Congo* ii. 284 (nomen) [Euphorbiaceae-Phyllantheae]; genus novum, inter Phyllantheas africanas simplicifolias inflorescentia terminali paniculata et capsula loculicide dehiscente distincta.

Flores dioici, petaliferi. Fl. ♂: *Sepala* 5, imbricata. *Petala* 5, sub disco inserta. *Disci* glandulae 5. *Stamina* 5, inter lobos disci inserta, sepalis opposita; filamenta libera; antherarum loculi distincti, paralleli, longitudinaliter dehiscentes. *Ovarii rudimentum* obconicum, supra complanatum. Fl. ♀: *Sepala* et *petala* maris. *Discus* breviter cupularis, undulate lobatus. *Ovarium* 3-loculare; stigmata 3, reflexa, integra; ovula in loculis gemina. *Capsula* ellipsoidea, integra, loculicide dehiscens, columellam persistentem relinquens, exocarpio crustaceo, endocarpio tenuiter corneo. *Semina* ambitu elliptica; testa e stratis 3 composita; stratum extimum (epidermis)

rubrum vel rubro-fuscum, nitidum, intermedium albidum, spongiosum, intimum crustaceum; albumen parcum; embryo rectus, cotyledonibus planis latis.—Arbores. Folia alterna, laxa vel conferta, petiolata, integerrima, penninervia. Paniculae terminales, ad apices ramulorum confertae.

Species 2.

Megabaria Trillesii, *Pierre MSS. ex Hutchinson*; *De Wild. Étud. Fl. Bas.- et Moy.-Congo* ii. 284 (nomen).

Arbor, ramulis teretibus glabris. *Folia* obovata vel elliptica, basi obtuse cuneata vel rotundata, apice obtusa vel rotundata, 9–17 cm. longa, 4–11·5 cm. lata, rigide chartacea vel tenuiter coriacea, utrinque glabra et opaca, nervis lateralibus utrinque 6–8 arcuatis versus marginem anastomosantibus supra distinctis subtus prominentibus, nervis tertiariis reticulatis utrinque distinctis; petioli 1–9 cm. longi, apice tumidi et rugosi, glabri; stipulae caducae. *Paniculae* ♂ ad apices ramulorum confertae, usque ad 9 cm. longae, axibus robustis sulcatis dense puberulis; rami spiciformes, circiter 1 cm. longi, basi ad 4 mm. nudi, unibracteati; bracteae late ovatae, apice rotundatae, 3 mm. latae, ciliatae et puberulae. *Sepala* 5, late ovata, obtusa, 1·5 mm. lata, versus marginem membranacea, breviter ciliata, extus parce et minute puberula. *Petala* parva, plus minusve elliptica vel obovata, apice 2–3-dentata. *Stamina* 5; antherarum loculi paralleli. *Disci* glandulae glabrae. *Ovarii rudimentum* columnare, apice complanatum, glabrum. *Flores* ♀ non visi. *Paniculae* fructiferae usque ad 15 cm. longae, axibus angulatis sulcatis minute puberulis. *Capsula* subsessilis vel breviter pedicellata, ellipsoidea, 2 cm. longa, 1·7 cm. diametro, exocarpio crustaceo 1·5 mm. lato, endocarpio tenuiter corneo. *Semina* ambitu elliptica, circiter 1·3 cm. longa, 1 cm. lata, rubra, nitida.

Tropical Africa. Cameroons: Bipinde, *Zenker*, 1083, 2572, 2603, 2846, 3556. Gaboon: Bata, *Trilles*, 157. Belgian Congo: Islands in the Lulanga River, *Dewevre*, 856; Eala, *Laurent*, 2035; Bolombo, *Laurent*.

I have not examined the specimens from the Belgian Congo.

1075. **Megabaria ugandensis**, *Hutchinson*; affinis *M. Trillesii*, Pierre, sed paniculis majoribus glabris differt.

Arbor 15 m. alta vel ultra, ramulis robustis glabris. *Folia* ad apices ramulorum conferta, late elliptica vel ovato-elliptica, apice obtusa vel breviter acuminata, basi rotundata vel paulo cuneata, 7·5–28 cm. longa, 5–15 cm. lata, chartacea vel tenuiter coriacea, utrinque glabra et opaca, nervis lateralibus utrinque 6–14 arcuatis versus marginem ramosis subtus prominentibus, tertiariis reticulatis laxis subtus distinctis; petioli 1·5–15 cm. longi, teretes, glabri, apice tumidi et rugosi; stipulae caducae, oblongae, obtusae, 4 mm. longae, 1 mm. latae, versus marginem membranaceae, glabrae. *Paniculae* ♂ ad apices ramulorum confertae, 15–20 cm. longae, axibus angulatis leviter sulcatis glabris; rami primarii graciles et elongati, inferiores usque ad 12 cm. longi; ramuli ultimi spiciformes, usque ad 1·3 cm. longi, basi nudi, unibracteati; bracteae late ovato-triangulares, usque ad 5 mm. longae et 3 mm. latae, versus marginem membranaceae, glabrae. *Sepala* 5, late ovata, membranacea, glabra. *Petala* 5,

parva, elliptica, membranacea, glabra. *Stamina* 5 ; filamenta quam sepala duplo longioria. *Disci* glandulae carnosae, glabrae. *Ovarii rudimentum* columnare, crassum, apice complanatum, glabrum. *Inflorescentiae* ♀ paniculato-racemosae ; bracteae maris ; flores breviter pedicellati, pedicellis fructiferis elongatis. *Sepala* et *petala* maris. *Discus* breviter cupularis, undulate lobatus, glaber. *Ovarium* ovoideum, glabrum ; stigmata parce papillosa. *Capsula* ellipsoidea, utrinque leviter cuspidata. *Semina* ambitu elliptica, circiter 1·3 cm. longa, 1 cm. lata, rubra, nitida.

Uganda. Luanhabya Forest, *Dawe*, 760 ; Entebbe, *Bagshawe*, 723.

Dr. Bagshawe states that this species is usually found in damp soil, and that the leaves are copper-coloured and said to be poisonous.

1076. **Thecacoris Batesii**, *Hutchinson* [Euphorbiaceae-Phyllantheae] ; affinis *T. stenopetalae*, Muell.-Arg., sed floribus masculis glabris differt.

Suffrutex circiter 0·6 m. altus. *Rami* glabri. *Folia* obovata, basi plus minusve cuneata, apice acute acuminata, 7·5–13 cm. longa, 4–6·5 cm. lata, utrinque glabra et opaca, nervis lateralibus utrinque 5–6 arcuatis subtus elevatis, venis laxis inconspicuis ; petioli crassi, 4–6 mm. longi, glabri vel supra minute puberuli ; stipulae ovato-lanceolatae, acuminatae, acutae, 6 mm. longae, glabrae vel juniores minute puberulae. *Spicae* ♂ vix ultra 2 cm. longae, glabrae, bracteis lanceolatis acutis breviter ciliatis. *Calycis* segmenta suborbicularia, minute ciliata. *Petala* lanceolata, acutissima. *Disci* glandulae truncatae, carnosae, glabrae vel minute et parce puberulae. *Ovarii rudimentum* obconicum, truncatum, integrum, glabrum. *Flores* ♀ juniores ignoti. *Capsula* triloba, depressa, fere 1 cm. diametro, lobis obtusis. *Semina* unilateraliter compressa, 4 mm. longa, nitida. *Pedicelli* fructiferi robusti, 5 mm. longi, minute puberuli ; bracteae ovatae, acutae, fere 4 mm. longae, ciliatae.

Tropical Africa. Cameroons : in bush along the path from the Batanga mission to Bongahela, *Bates*, 174.

1077. **Cleidion Mannii**, *Baker* [Euphorbiaceae-Crotoneae] ; species *C. gabonico*, Baill., affinis foliis tamen basi rotundatis ibique manifeste 3-nerviis differt.

Frutex scandens, 4·5–5-metralis, ramulis gracilibus glabris. *Folia* longe petiolata, oblonga, 6–8 cm. longa, 4–5 cm. lata, apice caudata, basi rotundata, membranacea, glabra, 3-nervia nervo centrali nervos secundarios subopppositos 3-jugos emittente. *Racemi* masculi breviter pedunculati, laxi, 7–10 cm. longi, ramulos breves patentes vel deflexos emittentes ; ramuli superiores 1-flori, caeteri 2–4-flori ; pedicelli filiformes, flores excedentes ; bracteae minutae, acutae ; alabastra globosa, glabra, 1·5 mm. diametro. *Sepala* oblonga. *Stamina* in capitulum globosum sepalis paullo brevius aggregata. *Flores feminei* ignoti.

Tropical Africa. Upper Guinea : Cameroons river, *Mann*, 1202.

1078. **Stylochiton Dalzielii**, *N. E. Brown* [Aroideae-Stilochitoneae] ; affinis *S. Barteri*, N. E. Br., sed spatha longiore acuminata et perianthio masculo tridendato differt.

Herba perennis. *Tuber* vel rhizoma erectum, 2–5 cm. longum, 1·5–1·8 cm. crassum, annulato-constrictum, basi truncatum, luteum, radices 2–5 mm. crassas emittens, 2–3-foliatum. *Foliorum* petioli 8–15 cm. longi, inferne vaginati; laminae 10–15 cm. longae, 3·5–6·5 cm. latae, sagittatae vel cordato-sagittatae, utrinque glabrae, lobis basalibus 2–3·5 cm. longis, lobo antico 8–12 cm. longo deltoideo-ovato vel anguste lanceolato. *Inflorescentia* solitaria, ante folia evoluta. *Pedunculus* 4–5 cm. longus. *Spatha* erecta, glabra; tubus 2·5 cm. longus, medio constrictus; lamina 2·7 cm. longa, lanceolata, concava, attenuato-acuta. *Spadix* 4·3 cm. longus. *Flores feminei* 5, monocycli, liberi; perianthium 5–6 mm. longum, urceolatum, ore contractum, oblique truncatum; ovarium liberum; stylus ultra perianthium 3 mm. exsertus; stigma capitatum. *Flores masculi* a floribus femineis interstitio 4–5 mm. longo separati et in spicam circa 3·3 cm. longam dispositi; perianthium 1 mm. longum, profunde trilobum vel tridentatum; stamina 3, filamentis antheris subaequilongis.

Northern Nigeria. Yola: very abundant in the northern Katagum district, *Dalziel*, 237.

According to Dr. Dalziel the rhizome of this plant is bright yellow, and the young leaves are used as a pot-herb after boiling away the acridity.

1079. Anthoxanthum brevifolium, *Stapf* [Gramineae-Aveneae]; affine *A. madagascariensi*, Stapf, et *A. Ecklonii*, Stapf, sed ab utroque foliis brevibus latisque, a priore praeterea glumis valvisque vacuis minus hyalinis latioribus, hisce magis pilosis et aristis validioribus munitis, ab altero spiculis minoribus distinctum.

Herba perennis, caespitosa; culmi florentes circa 20 cm. alti, laeves, glabri, 2-nodi, internodio summo ultra 5 cm. longo longe exserto. *Folia* laevia, glaberrima; vaginae striatae, summa superne subampliata, circiter 5 cm. longa, basales et innovationum breves; ligulae hyalinae, 0·5–1 mm. longae; laminae basales linearilanceolatae, acutae, 2·5–3·5 (rarius ad 4) cm. longae, ad 6 mm. latae, planae, firmulae, multinerves, caulinae superiores admodum redactae. *Panicula* spiciformis, 3–4 cm. longa, contracta; rhachis laevis; rami geminati, inaequales, alter ad 2 vel saepius 1 spiculam redactus, laeves; pedicelli laterales perbreves, omnes apice patule pilosi. *Spiculae* stramineae, fusco- vel fusco-purpureo-variegatae, circiter 7 mm. longae. *Glumae* a latere visae oblique lanceolatae, subacuminatae, ad carinas vix asperulae, inferior 5 mm. longa, 1-nervis, subhyalina, superior 7 mm. longa, 3-nervis, inter nervos herbacea, caeterum hyalina vel subhyalina. *Valvae* 2 inferiores vacuae, subaequales, a latere anguste oblongae, 4–4·5 mm. longae, rufescentes, pilosae, 5-nerves, inferior supra medium arista recta 3 mm. longa, superior infra medium arista geniculata ad 7 mm. longa munita; valva fertilis 2·5 mm. longa, laevissima.

South Africa. Cape Colony: Barkly East Division; on Ben McDhui (Wittebergen), 2955 m., *Galpin*, 6884.

1080. Achneria Galpinii, *Stapf* [Gramineae-Aveneae]; affinis *A. curvifoliae*, Hack., sed foliis latioribus involutis (haud canaliculatis) longe acutatis et spiculis majoribus distincta.

Herba perennis, dense caespitosa; culmi graciles, erecti, 12–15 cm. alti, laeves, glabri, indivisi, 2-nodi, internodiis exsertis. *Folia*

glabra, laevia; vaginae superiores superne tumidulae, infimae diu persistentes, fuscae; ligulae ad ciliola redactae; laminae foliorum basalium lineares, longae, acutatae, 2–3 cm. longae, rigidulae, superne vel tota longitudine involutae, foliorum caulinorum multo breviores. *Panicula* dense contracta, 1–2 cm. longa, oblonga; rhachis ramique parce minutissime tuberculati et ad nodos pubescentes; rami ramulique 2-nodi, capillares, rigiduli, scaberuli (saltem ramuli), rami infimi ad 2 cm. longi.; pedicelli inaequales, 3–1 mm. longi, scaberuli. *Spiculae* stramineae, congestae, ad 4 mm. longae. *Glumae* oblique lanceolatae, acutae, subchartaceae, glabrae, nitidulae, 1-nerves, subaequales. *Valvae* oblongo-lanceolatae (a latere) subacuminatae, submucronulatae, 3 mm. longae, membranaceae, in dorso et ad margines basin versus pilosulae, obscure 5-nerves; paleae quam valvae paulo breviores, 2-nerves.

South Africa. Cape Colony: Barkly East Division; slope of Ben McDhui (Wittebergen), 2955 m., *Galpin*, 6915.

X.—FORESTS OF THE GOLD COAST.

The recently issued Report on the Forests of the Gold Coast* by Mr. H. N. Thompson, Conservator of Forests, Southern Nigeria, demands careful perusal and attention since the general principles laid down are applicable not to the Gold Coast only but to tropical forests in general.

The Report occupies 238 pages and is divided into three parts with an appendix, list of vernacular names, twenty-four plates and a comprehensive index.

In the first part the various forest areas of the Gold Coast are described in detail, the value of their component trees is discussed and suggestions are made for their preservation or exploitation. Mr. Thompson is careful to point out the prime importance of the Forest to the Gold Coast Colony, and brings forward many illustrations of the irreparable damage which is being done by the reckless felling of trees, in connection principally with clearings for native cultivation. Before making any detailed comments on the first part the second and more general part of the Report may be considered. This is in some ways the most important portion and certainly the part of most interest to the general reader.

The importance of Forests is so well stated that the paragraphs relating to their effects on the physical and climatic conditions of a country are taken *verbatim* from the report.†

"1. They mitigate extremes of temperature and render the climate more equable.

"2. They exert a marked effect in regulating the water supply, more especially by ensuring the sustained feeding of springs and thus rendering the flow of water in rivers more continuous, and in tending to reduce the danger of violent floods.

* Gold Coast. Report on Forests by Mr. H. N. Thompson—Col. Rep. Misc. No. 66, 1910.

† Thompson l.c., p. 102.

"3. They increase the relative humidity of the air, and in consequence reduce the amount of evaporation. This effect is strongly marked on hills in the tropics.

"4. By the mechanical action of their roots and stems the plants composing forest vegetation assist in preventing land-slips, erosion of hill-sides, the silting up of rivers, and arrest the progress of shifting sands.

"5. They tend to increase the precipitation of moisture.

"6. They act as wind-breaks, and protect adjoining cultivated areas against the action of cold or dry wind.

"7. They act as barriers against the spread of fungoid and insect attacks from one cultivated centre to another.

"Almost all these effects are more pronounced in the tropics, especially in localities with well-marked wet and dry seasons, than they are in the temperate zone."

The regulation of the water supply is one of the most important and far reaching effects of forests in such a country as the Gold Coast. With the cutting down of forests a gradual change in the vegetation at once sets in, if such forest be well within the region of 'Rain Forest' no very serious consequences may result, if, on the other hand, the forest area lies on the borders of the rain forest region the reckless cutting down of the tree vegetation will so alter the conditions that the character of the country will quickly change from that of rain forest to deciduous forest and finally to that of the Savannah country. The places once occupied by trees will be invaded by grasses and as soon as they have established a footing the forest is doomed; the region becomes exposed to forest fires, the rainfall is not retained by the ground and the head waters of the springs, formerly receiving a constant supply of water from the damp forest-covered hill-sides, now obtain a torrential supply of water during the rains but are waterless during the dry season. The action of cutting down forest under such conditions not only may cause infinite harm in the actual region but may also cause much injury to areas far distant by interference with the proper water supply. Mr. Thompson points out that with the alteration in conditions of the forest the majority of the species of timber and other important trees confined to the moist evergreen forests disappear and all such agricultural crops which depend on moist conditions, as cocoa, rubber, &c. will also suffer and their cultivation may utimately become impossible.

It is clear therefore that the Forests of the Gold Coast and of our other West African possessions need efficient control and supervision.

Mr. Thompson deals very fully with this side of the subject and points out the lines which legislation might follow. The chief danger menacing the Gold Coast Forests is not their over-exploitation for forest produce but their wholesale destruction for farming purposes. It would appear, therefore, that any measures adopted for the "reservation" or "protection" of the forests should also be accompanied by provision for the instruction of the natives in methods of more intensive agriculture. At page 82 of the Report some general remarks will be found on the question of agricultural instruction in its relation to forestry.

Mr. Thompson makes a very interesting and apt comparison between the forests of the Gold Coast and those of the Southern Shan States of Burma, and it is possible that the policy followed in the East might prove suitable for the conditions which obtain in West Africa. Of the arrangements suggested, perhaps the most important are those relating to forest taxes, the sale of timber, and the revenues derived therefrom.

In concluding this section on the protection of the forest, it is conceded that something might be done in the way of persuading chiefs to look after the forests but it is only a method of chance depending on the influence of a few officials and is a slow process, "meanwhile the forests are being rapidly destroyed." It may confidently be asserted that no real progress has or ever will be made in Forest Conservancy unless the Supreme Government reserves to itself the right to direct and regulate its application. It is only the Government that can have the tenacity of purpose to carry the forests through the various vicissitudes and bring them into an organised condition capable of ensuring a sustained and increasing yield of produce in the future.

In the first part of the Report detailed information of the forests and of the condition of the country is given on which the general account of the second part is largely based.

The Aburi hill forests (*v.* p. 10), situated on the edge of the Accra plains afford a useful but disastrous object lesson of the effect of removing the forest. Cassava farms, made by clearing the forest, when abandoned to lie fallow become occupied by grasses and as the grasses are burned every year the exposed soil is washed away during the rainy season and denudation of the hillsides begins.

The drying up of streams, which is also associated with forest destruction, has actually occurred fairly recently in two instances near Aburi. In some cases the natives in clearing the forest leave some of the largest trees as standards and on such ground a tangled mass of vegetation springs up. Conspicuous among trees in such secondary growth is the "umbrella tree" *Mussanga Smithii* (Plate 24), which grows rapidly and has a dense canopy of leaves and though the value of the forest as far as produce is concerned is lost, still the ground is not exposed to the dessicating action of sun and wind or to the force of the rain and the physical effects of complete forest destruction do not occur. The umbrella tree, however, has this disadvantage that owing to its dense shade the growth of more valuable species is delayed.

At the commencement of Chapter ii., useful information is given as to some of the more important timber trees, such as *Piptadenia africana*, *Triplochiton Johnsonii*, *Terminalia superba*, one of the shingle trees, the Khayas, *Sarcocephalus esculentus*, and others. Of the "Waw-waw," *Triplochiton Johnsonii*, Mr. Thompson remarks "It is quite good enough in quality to replace the imported pitch-pine and it is extremely abundant: our West African forests contain sufficient supplies not only to meet large demands for it in the home markets, but also in the local ones."

Chlorophora excelsa (Plate 23), "Odoum" furnishes the best all-round timber in tropical West Africa, it is plentiful in Ashanti; among other trees of first importance are the West African cedars of the genus *Pseudocedrela* (Plates 10–13).

The genus *Khaya*, the Gold Coast mahogany, is represented by several species; five are figured in the Report (Plates 4–8 incl.). It is unfortunate that the species known as "Dubini" by the Fantis has not yet been properly determined owing to lack of sufficient material, since it is stated that the bulk of the Gold Coast mahogany is afforded by this species (Plate 8).

In addition to *Piptadenia africana*, a common timber tree, there is another species figured in the Report at Plate 17 under the name *Piptadenia* sp., a timber tree of some importance and very prevalent in Southern Ashanti.

Since the publication of the Report this species has been identified with *Cylicodiscus gabunensis*, Harms, a plant which was, until lately, very imperfectly known. *Cylicodiscus* was originally described from flowering specimens collected by Soyaux in Gaboon and by Staudt in the Cameroons, whilst the fruits served for the basis of another new genus, *Cyrtoxiphus*, and it was not until 1906 that Harms recognised that the latter represented the fruiting condition of the former. The genus *Cylicodiscus* differs from *Piptadenia* firstly in the presence of a disc inserted between the stamens and the base of the gynophore, and secondly in the very long woody pods. *C. gabunensis* was also discovered in Southern Nigeria by Dr. Unwin and Mr. Foster, and its area extends evidently throughout the greater part of the West African forest region.

A good timber which also yields a first-class fuel is the "Kokoti," to which the name *Pynaertia ealaensis* is given in the Report. A note on this tree appeared in the *Kew Bulletin*, 1909, pp. 309–312, in which it is shewn that this tree, a member of the natural order *Rhizophoraceae*, should be referred to Engler's genus *Anopyxis* and should bear the name *Anopyxis ealaensis*.

Mr. Thompson points out the wealth of the Ashanti forests, which contain large quantities of Pseudocedrelas, Khayas, Funtumias and other valuable trees. He is of the opinion that a special effort should be made to protect these forests and bring them under organized control. It is perhaps fortunate that at present the mass of this forest area is not easily accessible.

Of these forests in general he remarks: "I think that in number and variety of valuable trees these extensive forests of Western Ashanti will be hard to match anywhere in Africa. Moreover, the undergrowth is not so dense as that prevailing in evergreen forests to be met with near the coast, and in consequence the natural regeneration of the more important species is far more satisfactory and the gaps in the various age gradations less pronounced."*

The Savannah forests of North-Western Ashanti appear to be in greater need of forest conservancy in some ways than the forests of the moist regions, since they form the belt between the open grass land and the country where there is greater moisture. It is in this region of mixed deciduous forests that fire protection is an essential

* Thompson l.c., p 61.

feature of any conservancy programme. The timber in this region is also valuable, including such trees as *Khaya senegalensis*, the "dry zone" maghogany, *Afzelia africana*, and the "dry zone" cedar, *Pseudocedrela Kotschyi*, all suitable for the home market. As mentioned before the proper preservation of such forest areas as these is intimately bound up with far-reaching questions of water supply.

In discussing the question of reserved areas Mr. Thompson lays stress on the necessity of reserving the forests clothing the *crests of the hills* and the *steep slopes* from the operations of the farmer on the general grounds of preserving the climatic conditions that are of most value to the country.

When discussing the dry open country of the Afram plains (Report, pp. 84–92) some useful information is given as to the various plants and trees of this region from which it appears that the list of useful plants is one of some length and includes plants of considerable value.

A few remarks on the subject of game and game laws are of interest and deserve attention. It is pointed out that whilst Europeans are obliged to take out licences and are restricted as regards the shooting of certain species, no steps whatever have been taken to limit in any way the incessant slaughter carried on by the natives. The European's bag is as nothing compared with the annual bag of the native and game preservation at present is a failure. The hunting class appears to be composed of those who were formerly the fighters and now, owing to peaceful times, having been deprived of this employment, have taken to the chase of wild animals with renewed energy.

In conclusion, it may be pointed out that the problems confronting the Gold Coast Colony with regard to its forests are difficult and serious, since the preservation of the evergreen forests, on which the water supply so largely depends, and of the deciduous forests forming a belt against the Savannah Country, is at stake, and with this is bound up the general character of the agricultural operations of the colony. The most pressing need in connection with forest conservancy is the prevention of the wholesale destruction of the forest for farming purposes, in comparison with which the accumulated effect of timber exploitation is stated to be "a mere bagatelle."

XI.—MISCELLANEOUS NOTES.

Miss E. M. Wakefield, lately of the School of Rural Economy, Oxford, has been appointed by the President of the Board of Agriculture and Fisheries to the post of Assistant in the Royal Botanic Gardens, Kew.

Mr. Thomas Douglas Maitland, a member of the gardening staff of the Royal Botanic Gardens, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, a Curator in the Agricultural Department of Southern Nigeria.

A Hybrid Strelitzia.—In the Mexican house at Kew there is now in flower for the first time a hybrid *Strelitzia*, the result of crossing 11 years ago *S. Reginae* and *S. augusta*, the former being the mother parent. The plant is 5 feet high and has 10 leaves shaped as in *S. augusta*, but the petioles are 18 inches long and the blades 2 feet by 15 inches. The peduncle is axillary, 18 inches long; the spathe is horizontal as in *S. Reginae*, with several vertical flowers, which expand in slow succession and are of a pale watery-yellow colour. There is a wide difference between the two parents, *S. augusta* having a woody stem 12 feet or more high and distichous leaves of which the petioles are 6 feet and the cordate blade 3 feet long; the peduncle is very short and stout, the spathe is purple and the flowers are white. *S. Reginae* has no distinct stem, but the tuft of leaves spring from a fleshy rootstock; the petioles are 3 feet long and slender, and the blades measure a foot by 4 inches; the peduncle is about a yard long, the spathe is glaucous-green tinged with red and the flowers are of a bright orange colour, the conspicuous arrow-shaped fused petals being violet-blue. Both the parent species are also in flower in the same house. The hybrid has been named *S. kewensis*.

The dimensions of the flowers are as follows:—

	S. augusta	*S. Reginae*	*S. kewensis*
Sepals length ...	6½ ins.	4½ ins.	5 ins.
Petals „ ...	4¾ „	3½ „	3¾ ins.

The general appearance of the flower in *S. kewensis* resembles that of *S. Reginae* more closely than that of *S. augusta*. The stamens are enclosed in the fused petal-sheath in the hybrid and in *S. Reginae* but are exposed in *S. augusta*. The small hooded petal of the hybrid, however, is much more like that of *S. augusta* and it is also interesting to notice that the lilac-pink patches at the base of the sepals in *S. augusta* are also present in a similar position in the hybrid.

Agave Elemeetiana.—A fine example of this species has been flowering during the past few weeks in the succulent house. The spike, which reaches to the roof, is about 15 feet in length and, with the exception of the lower two feet, is densely crowded with flowers. From an estimate there would appear to be about 3,150 flowers on the spike.

According to Mr. Baker this plant is a native of Mexico. It was introduced about 1864 and named in compliment to Mr. de Jonge Van Elemeet, of Overduin, in Zealand, the companion and biographer of General Von Jacobi and the owner of a remarkable collection of Agaves. It was flowered in 1867 by Mr. Saunders, and a coloured figure appeared in the *Refugium*. It is now widely spread in collections and flowered at Kew in 1874, 1877, and again in 1883. It is monocarpic, dying after flowering, like its near ally *A. attenuata*, and is a most distinct and unmistakable species.

Presentations to the Library during 1909.—The Bentham Trustees have again come to the assistance of the establishment by making

purchases of books for the library. Through their liberality a good copy of Redoute's fine work, the *Choix des plus belles fleurs*, has been acquired. It appears to be very scarce, especially in a complete state. In 1892 a copy was offered by a London bookseller for £20, and ten years later another was sold by auction by Messrs. Sotheby, Wilkinson and Hodge for £31. Pritzel and some other bibliographers state that the work, which was published in Paris between 1827 and 1833, contains 144 plates, while another gives the number as 143. The Kew copy contains 145.

From the same source has been received an excellent copy of the first edition (Paris, 1553) of *Les observations de plusieurs singularitez et choses memorables trouvées en Greece, Asie*, &c., by Pierre Belon, a small quarto of 210 folios, with numerous illustrations in the text. There were several other French editions between 1554 and 1588, and in 1589 a Latin translation by Clusius was published in Antwerp. It may be remarked that the portrait of Belon and the illustration of Mount Sinai, which are present in the 1555 edition, are both absent from the first edition, though according to Pritzel's collation this edition should contain the portrait.

The Bentham Trustees have also presented a set of the *Bulletins du cercle professoral pour le progrès de l'Arboriculture en Belgique* or, as they were afterwards called, *Bulletins d'Arboriculture, de Culture potagère et de Floriculture*. This publication was edited by F. Burvenich, Ed. Pynaert, and others, and was first issued in 1865. The Kew set comprises 39 volumes, extending to 1905. The work is chiefly of interest to the horticulturist, and especially to the pomologist. Among other presentations by the Bentham Trustees are two copies of the fourth volume of Elwes and Henry's *Trees of Great Britain and Ireland*, and the sixth (and last) series of Boudier's *Icones Mycologicae*.

Sir Frank Crisp, J.P., F.L.S., has presented the *Cyclopedia of American Agriculture*, edited by L. H. Bailey, in four large octavo volumes; *La flore alpine*, Genève [1908?], by H. Correvon and P. Robert, and *Planting and Ornamental Gardening*, London, 1785, a work attributed to William Marshall.

Dr. N. L. Britton, Director-in-Chief of the New York Botanical Garden, has been for many years a liberal contributor to the library. During last autumn he sent to Kew a very large collection of the publications of the various United States Agricultural Experiment Stations, excluding those of the United States Department of Agriculture. Of these 1,064 have been selected for the library. They are indexed in that extremely useful publication, *The Experiment Station Record*, published by the United States Department of Agriculture, which, with selections of the copious literature issued by that department, is regularly sent to Kew through the kindness of the Secretary of Agriculture, Washington.

During the year two more parts of the *North American Flora*, the colossal work which is being published by the New York Botanical Garden, were presented by Dr. Britton from whom nine parts had previously been received. According to the present design the Flora will comprise thirty-two large octavo volumes.

Dr. W. L. Jepson has commenced the publication of his *Flora of California* and has presented to the library the two parts issued, which include Pinaceae to Taxaceae and Salicaceae to Urticaceae.

The *Flora der Schweiz* of Prof. Hans Schinz and Prof. R. Keller has reached its third edition, the first part of which was published in 1909 and was presented by Prof. Schinz, who has also, as in former years, sent to Kew the botanical publications of the University of Zurich.

Many efforts have been made during the last fifteen years to complete the supplementary volumes to the first edition of Sowerby and Smith's *English Botany*, the last two (iv. and v.) of which were very imperfect. In 1903 the late Dr. M. T. Masters completed vol. iv. by presenting plates 2,912 to 2,960, with text and index. The last volume was left incomplete by the publishers and only four or five parts were issued, the last ending with plate 2,998 and letter-press for plate 2,999, which was never engraved. Kew possessed only a small portion of the fifth volume and this had been presented by Messrs. Dulau and Co. Through the kindness of Messrs. W. Wesley and Son this volume has now been completed as far as possible.

The voluminous manuscripts on the Cyperaceae by the late Mr. C. B. Clarke have been presented by his Executors. They consist of 11,722 narrow sheets written in the well-known small neat style, often with pen-and-ink sketches in the margin. They have been bound in thirty-one volumes. There are in addition many thousands of references to Cyperaceae written on small slips. These have been pasted down in six thick folio volumes. Two copies of the *Illustrations of Cyperaceae*, about which particulars are given in the *Kew Bulletin*, 1909, p. 280, have been received, one from Mr. G. Massee and the other from the publishers, Messrs. Williams and Norgate.

A few only of the numerous additions to the library made by presentation during the year are mentioned in the foregoing note. The detailed list of accessions is in preparation and will form Appendix ii. to the current volume of the *Kew Bulletin*.

S. A. S.

Botanical Magazine for February.—The plants figured are *Coelogyne Mooreana*, Sander, (t. 8297); *Populus nigra*, Linn., var. *betulifolia*, Torrey, (t. 8298); *Campanula Beauverdiana*, Fomin, (t. 8299); *Rhododendron Keiskei*, Miq., (t. 8300); and *Agonis marginata*, Schau., (t. 8301).

The *Coelogyne* is a recent introduction from Annam, where it was collected for Messrs. Sander & Sons, of St. Albans, by Mr. Micholitz. It flowered at St. Albans for the first time in December, 1906, and simultaneously at the Royal Botanic Garden, Glasnevin, whence the material figured was obtained. The Kew plant, which was presented by Messrs. Sander, has not yet flowered. The species is allied to *C. cristata*, Lindl., differing in having longer leaves, taller scapes, deciduous bracts and smaller flowers. *Populus nigra*, var. *betulifolia*, is an elegant form of the Black Poplar, which, for a century or more, has been cultivated in this

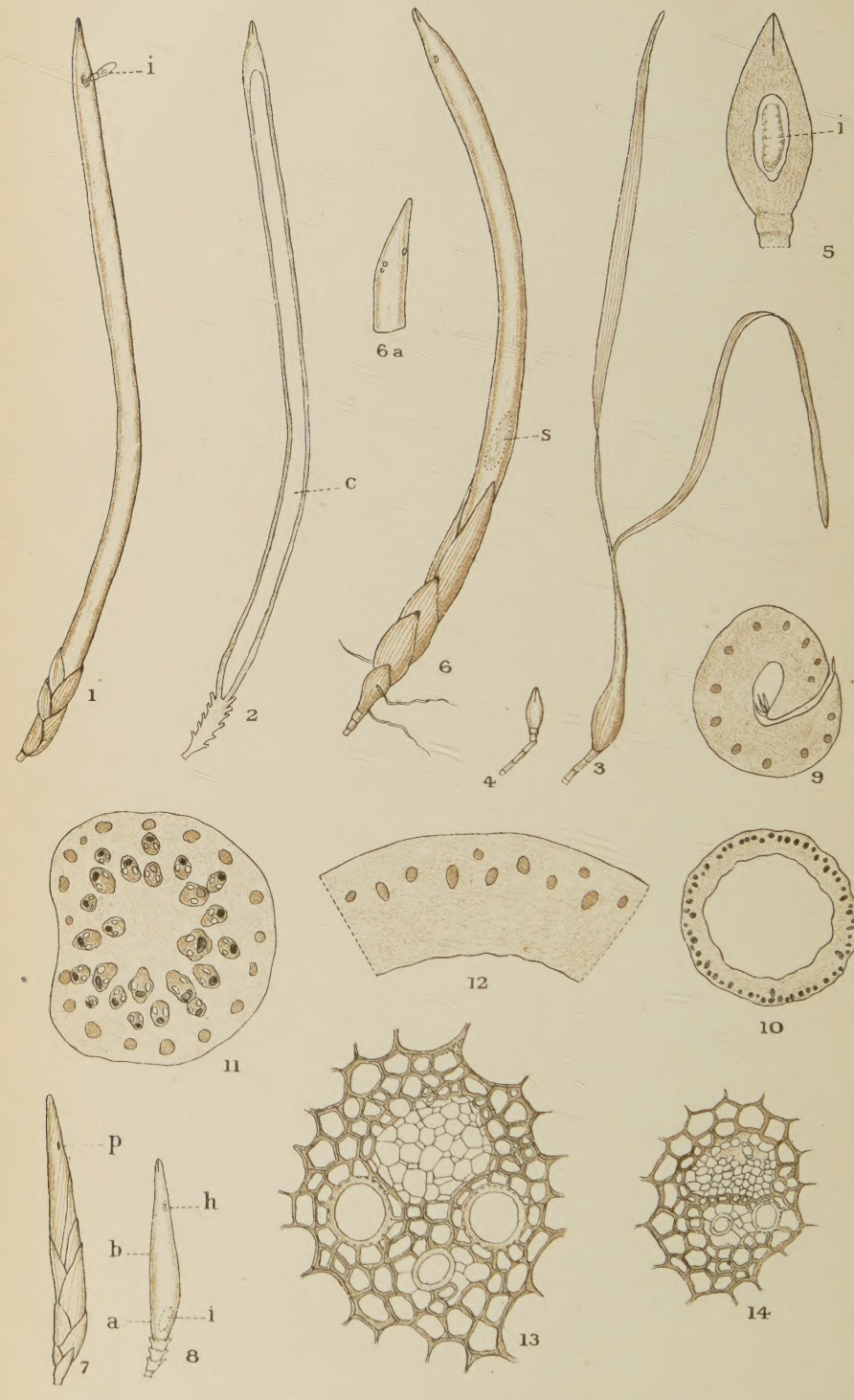
country and is sometimes met with in remarkably fine specimens, which have an Elm-like appearance. It is more ornamental than the type, and moreover differs from it in having more or less pubescent young branches and petioles. This interesting tree was first described by the younger Michaux as *Populus hudsonica* and shortly after by Pursh as *P. betulifolia*, from specimens found growing on the Hudson River and about Lake Ontario, where it had apparently been introduced, almost certainly from Europe. The *Campanula* is a native of Transcaucasia and Northern Persia, and the plant figured was raised at Kew from seed received from the Botanic Garden, Tiflis, Caucasus. It has pale blue, broad, campanulate flowers about 1¼ in. across. *Rhododendron Keiskei* is a Japanese species with rather small greenish-yellow flowers in clusters of 3 to 5. The illustration was prepared from a plant which was procured from a Yokohama nursery in 1908. *Agonis marginata* is a pretty myrtaceous shrub from Western Australia which has been figured from a specimen grown in the open in the garden of Mr. T. A. Dorrien Smith, Tresco Abbey, Isles of Scilly.

Witches' Brooms of Cacao.—Under the above title, an abstract was given in the *Bulletin*, 1909, p. 223, of an investigation conducted by Dr. C. J. J. van Hall, Inspector of Agriculture in Dutch Guiana, and Mr. A. W. Drost, who not only indicated the cause of the formation of Witches' brooms on the cacao plant, but also the origin of the diseases attacking the pods of the same plant. An English translation of this important paper, accompanied by the illustrations present in the original, has just appeared in the "Proceedings of the Agricultural Society of Trinidad and Tobago," vol. ix., December, 1909, pp. 475–562. The following points in connection with preventive measures were not included in the previous abstract in the *Bulletin*.

So far as has been ascertained, the fungus causing Witches' brooms and the pod disease, is confined to the cacao plant. Most success is to be expected from treatment by which the parasite is directly attacked. Considering the great number of Witches' brooms, hardened pods and infected cushions which a diseased tree bears, a removal of the entire leaf-bearing crowns of the tree becomes imperative, so that after all the leaf-bearing branches are cut off, nothing remains but the trunk and leafless main branches. After this operation the tree should be thoroughly sprayed with a three per cent solution of sulphate of copper. Trees thus treated form new crowns in a surprisingly short time. Cutting back should be done at the commencement of the principal dry season of the locality.

To ensure success cutting back should be conducted simultaneously over as large an area as possible. All pruned branches should be promptly burned.

G. M.



Galls of Ischaemum pilosum.

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[To face page 69.]